Paediatrics

Version 5.3

Corrected, Updated, Lighter

PLAB 1 Keys is for PLAB-1 and UKMLA-AKT (Based on the New MLA Content-Map)

With the Most Recent Recalls and the UK Guidelines

ATTENTION: This file will be updated online on our website frequently!

(example: Version 2.5 is more recent than Version 2.4, and so on)

Key 1	**Acute epiglottitis**

- A rare but serious infection
- Caused by **Haemophilus influenzae type B**.
- Immediate recognition and treatment is essential as airway obstruction may develop.
- Epiglottitis was generally considered a disease of childhood but in the UK, it is now more common in adults due to the immunisation programme.

◘ The incidence of epiglottitis has decreased since the introduction of the **Hib vaccine**. (**Hib** = **Hemophilus Influenza type B**).

Features

√ rapid onset

√ **high temperature**,

√ **generally unwell, toxic child**

√ **stridor**

√ **drooling of saliva**

√ ***Muffling/ hoarse / Changing voice***.

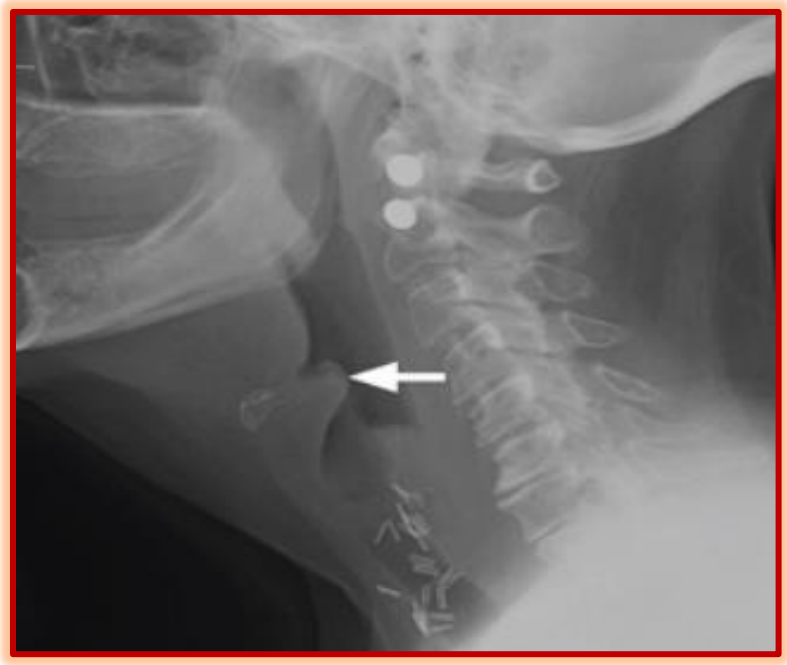
√ lateral neck X-ray → **Thumb sign**

◙ Rx

◙ **Call (Summon) anaesthetist → Intubation** "before airway obstruction occurs"

◙ **Secure His Airways**

Any of these two would be a valid answer in Acute epiglottitis.



Acute epiglottitis – Thumb sign.

Key 2

Croup (Laryngotracheobronchitis)

◙ An upper respiratory tract infection seen in infants and toddlers.

◙ Commonest organism → **Parainfluenza viruses**.

◙ Features

√ **stridor**

√ **barking cough** (worse at night) "**often the hint**"

√ fever

√ **coryzal symptoms**

√ X-ray → **Steeple sign**.

◙ **If moderate to severe, we admit. Look at these features of severe croup**:

♠ Frequent barking cough.

♠ Prominent ***inspiratory*** (and occasionally, expiratory) ***stridor*** at rest.

♠ Marked sternal wall retractions.

♠ Significant distress and agitation, or lethargy or restlessness (a sign of hypoxaemia).

♠ Tachycardia occurs with more severe obstructive symptoms and hypoxaemia.

◙ Management of Croup (important √)

√ A single dose of **oral dexamethasone** (0.15mg/kg) to **all** children regardless of severity.

(***Prednisolone*** is an ***alternative*** if dexamethasone is not available).

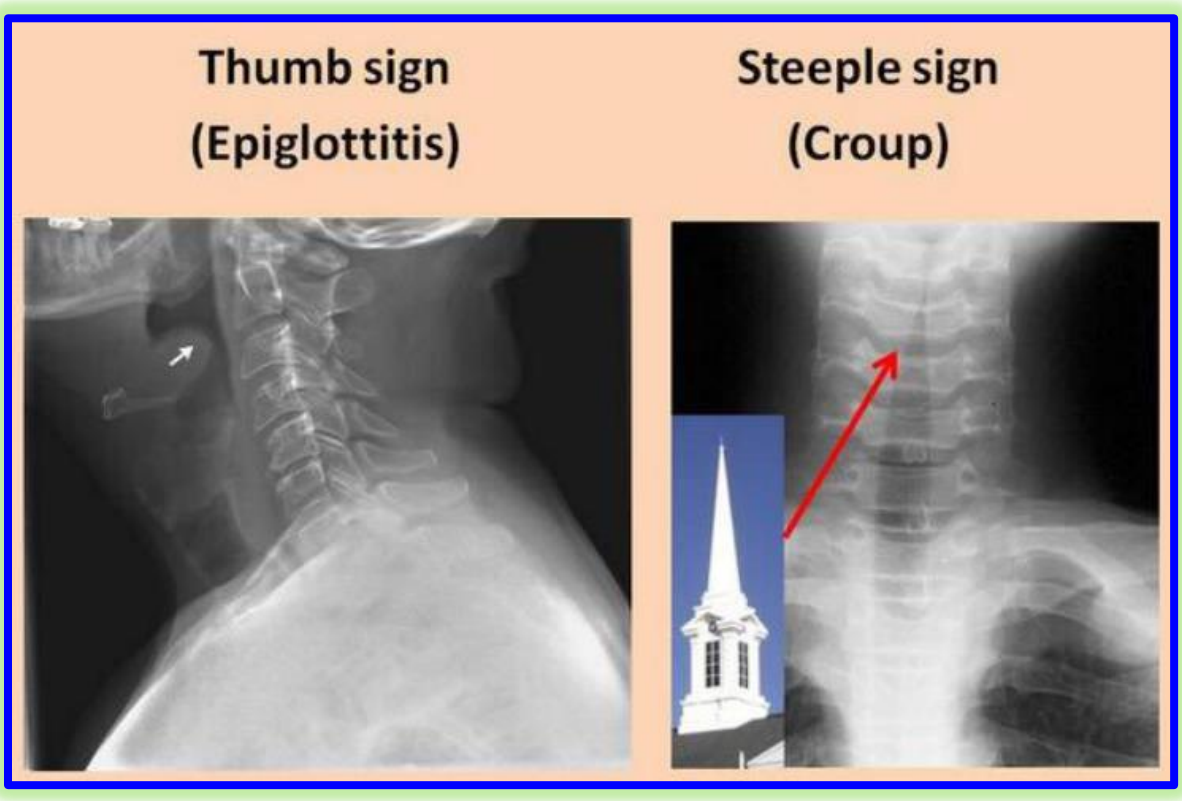
◙ Emergency treatment

high-flow O2

Nebulised adrenaline → In severe cases of croup.

√ The prognosis of most cases of barking cough (Croup) is:

→ **natural resolution (complete recovery)**.



Key 3

Nocturnal Enuresis.

♦ The majority of children achieve day and night time continence by 3 or 4 YO.

♦ Enuresis → ***'involuntary discharge of urine by day or night or both, in a child ≥ 5 YO, in the absence of congenital or acquired defects of the nervous system or urinary tract'***.

♦ Nocturnal enuresis can either be:

- **Primary** (the child has never achieved sustained continence before) or,
- **Secondary** (the child had been dry for at least 6 months before).

Management of Primary Enuresis

(The child has never achieved sustained continence before)

◙ **If WITH Daytime enuresis (+) > 2 YO**

→ **Refer to 2ry care or enuresis clinic** for further assessment.

This is the case here but he is already being seen in the 2ry care.

Important Causes (imp. √):

√ Urinary tract infections (need urine dipstick, urinalysis, possibly urine culture and antibiotics).

√ Urge incontinence (Overactive bladder):

- This is treated by → Bladder retraining.

- Another valid answer is → Behavioural Therapy.

- If Bladder retraining and or Behavioural therapy are not given in the options or tried but failed, go for → Oxybutynin or Tolterodine, which are antimuscarinic drugs (anticholinergics).

√ Others: congenital malformations, chronic constipation, neurological disorders.

◙ **If WITHOUT Daytime symptoms** (only night bedwetting)

• *< 5 YO* → ***Reassure*** (they may achieve continence soon).

• *≥ 5 YO*:

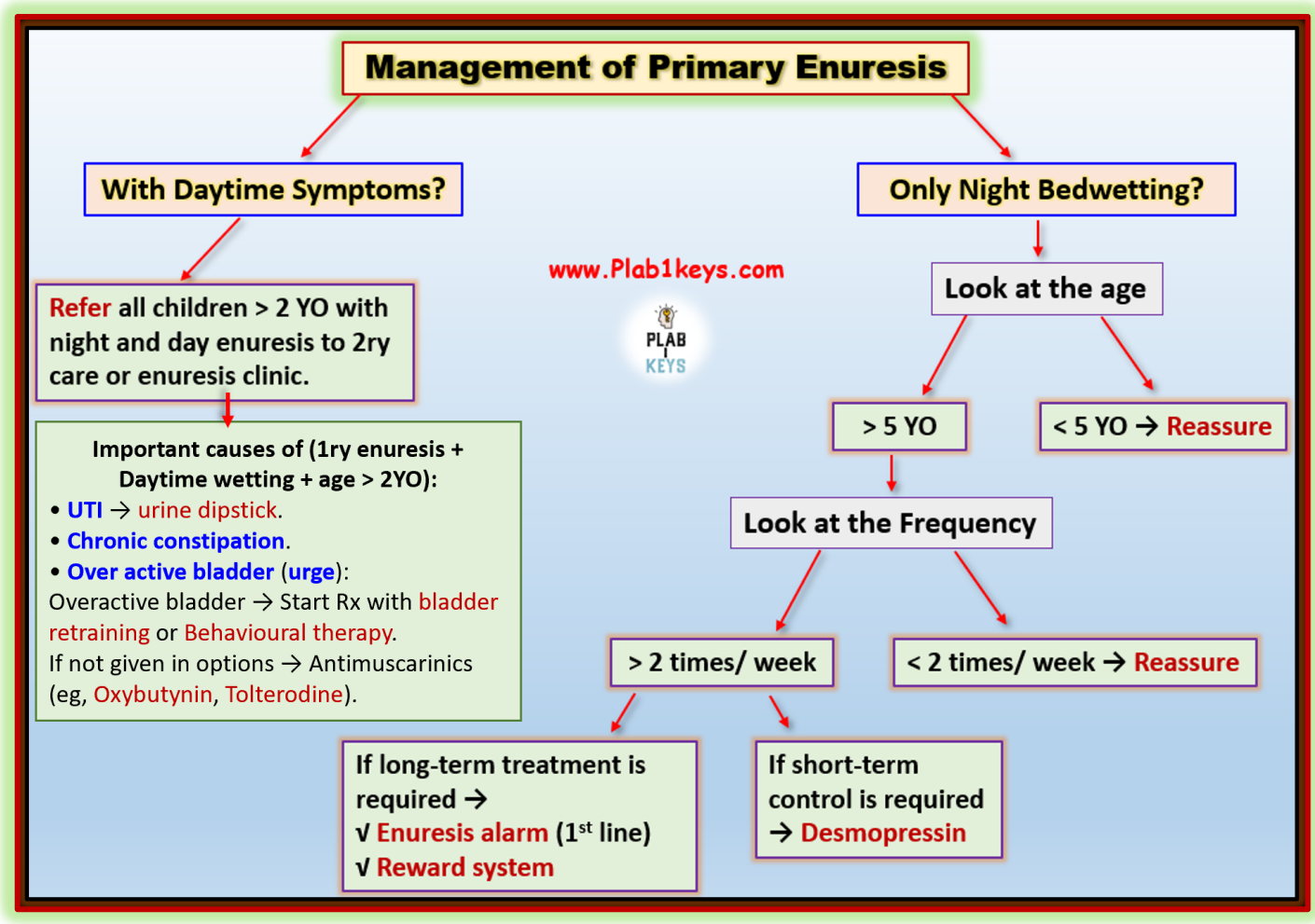
◘ If **infrequent** (<2 times a week) → ***Reassure***.

◘ If **frequent** (>2 times a week):

- **If Long-term control is required** → **Enuresis alarm** (first-line) + **Reward system**.

- **If short-term control of bedwetting is required** (**eg,** the child is going to sleep at a camp for 2 days) **or** > 7 YO → **Desmopressin -orally not intranasally-** (ie, for temporary control and is also useful in overactive bladder ie urge incontinence).

If after 2 complete courses of treatment with alarm, reward system, desmopressin, they are still bedwetting → **Refer to 2ry care**.



Management of 2ry Enuresis.

The child was dry for at least 6 months of his life and then started wetting himself at night ± at daytime

→ **Refer to a Paediatrician**

√ Common causes of 2ry enuresis → **Emotional upset** (could be a result of child abuse), UTI, DM (polyuria), constipation. Therefore, a paediatrician needs to investigate possible causes.

General Points

√ Look for possible underlying causes/triggers (e.g. Constipation, diabetes mellitus, UTI if recent onset, emotional upset).

√ Advise on fluid intake, diet and toileting behaviour.

√ Reward systems (eg, Star charts). NICE recommend these 'should be given for agreed behaviour rather than dry nights' e.g. Using the toilet to pass urine before sleep, give reward.

√ NICE advise: 'Consider whether alarm or drug treatment is appropriate, depending on the age, maturity and abilities of the child or young person, the frequency of bedwetting and the motivation and needs of the family' (Ass shown above).

√ Generally:

◘ An enuresis alarm is first-line for children under the age of 7 years.

	◘ desmopressin may be used first-line for children over the ago 7 years, particularly if short-term control is needed or an enuresis alarm has been ineffective/is not acceptable to the family.
Key 4	**Reflux Nephropathy** • Urine goes back from bladder to ureters and kidneys (Vesico-Ureteric Reflux) → Dilated Pelvicalyceal system → **Repeated UTIs** → Progressive **Renal Failure**. • Occurs mainly in the young (**children**). ♦ An important cause → Congenital abnormality of the insertion of ureters into the urinary bladder (can be seen on US). ♦ **Dx** √ Initial → Renal Ultrasound (+) Urinalysis, urine culture and sensitivity. √ Gold standard → Micturating Cystourethrogram. (Not done >3 years age). √ For parenchymal damage (cortical scars) → Technetium Scan (DMSA).

	For Exam: Recurrent UTIs in children: • First-step → US. • Next step→ DMSA. (Not urgent, can be booked 4-6 month after acute UTI). ♦ **Rx** √ Initially → Low-dose antibiotics prophylaxis (trimethoprim) daily. √ Failed? Or Parenchymal damage? → Surgery (Ureters Re-implantation).
Key 5	◙ **Branchial cyst** → **Lateral** neck mass – **Not-translucent**. ◙ **Lymphangioma** → **Lateral** neck mass – **Translucent**. *Lateral = along or near sternocleidomastoid muscle.* ◙ Painless, mobile lump in the anterior **midline** neck that moves up with tongue protrusion ➔ **Thyroglossal Cyst.** √ The most appropriate Ix → **Ultrasound**! If suspicious → FNAC

	Notes: * Thyroglossal cyst is the commonest neck congenital anomaly. * It may become painful if infected. * A thyroglossal cyst moves up with tongue protrusion because it is attached to the thyroglossal tract which attaches to the larynx by the ***peritracheal fascia***. - A neck midline lump that moves up with swallowing → Goitre? - Fluctuant lump and transilluminate in the neck → Cystic hygroma?
Key 6	**Suspect Non-Accidental Injury (Child Abuse) in Paediatrics if:** ◙ **Delayed presentation** to medical care. ◙ **Delay in attaining milestones** (eg, low weight for age). ◙ Lack of concordance between proposed and actual mechanism of injury (the carer gives a Hx which is not compatible with the signs and injuries). ◙ **Multiple injuries.** ◙ **Injuries**/ **Bruises** at **sites not commonly exposed to trauma.** ◙ Bruises are often of varying degrees and colours. ◙ A child/ baby lives with a **step-parent** or a **friend**.

◙ **Irritable**, **crying**, **distressed** baby with multiple bruises (in pain).

◙ The victim child is **Not making eye contact**.

Management

Admit to ward

→ **relieve pain** and **treat underlying medical conditions**

→ **perform Skeletal Survey** (Then)

→ **inform local safeguarding**

→ **refer to social service**

◙ **Note that the answer can be a mix of two of the above.**

For example, → Admit to general paediatrics ward + Refer to social service.

◙ **Also note that after giving analgesia, perform Skeletal Survey and THEN seek legal child protection (inform safeguarding, refer to social services).**

Note, do not get distracted by a "runny nose" in a baby with low weight for age, multiple bruises and irritability. Runny nose might just be a result of excessive crying 2ry to pain and abuse.

Other Distractors (DDx)

Bruises: (See haematology chapter)

- **Haemophilia** (X-linked recessive, so the affected individual is a boy mainly)

→ ↑ **PTT** + (Bleeding into muscles or joints or easily bleeds).

- **Henoch-Schonlein Purpura (HSP)**

HSP → **PAAN**: non-blanching **P**urpura ± **A**rthralgia, **A**bdominal pain, **N**ephropathy (Hematuria, Proteinuria).

- Purpura is **non-blanching** and mainly on the **buttocks** and **Lower Limbs**.
- Precipitated by **URTI – Sore Throat**.
- All Blood Results are **NORMAL** "Normal Hb, WBCs and Platelets".
- However, there might be ↑ **ESR/ IgA/ Creatinine**.
- One rare complication of HSP is → **Intussusception** (severe abdominal pain + rectal bleeding in 6-36 months old. It can develop a few days after HSP)

- **Idiopathic Thrombocytopenic Purpura (ITP)**

Isolated Thrombocytopenia (low platelets) has to be given in a stem.

Fractures

• **Osteogenesis Imperfecta**

(Type 1- Autosomal dominant – collagen metabolism disorder → Brittle Bone Disease)

Other hints would be given, which are:

Blue Sclera ▌Dental abnormalities ▌Brittle bones - ▌Multiple/ Unexplained fractures ▌Hearing loss 2ry to Otosclerosis

→ Give **Bisphosphonate**

Key 7

Management of Acute Asthma Exacerbation in Paediatrics

1 ♦ **O2**

2 ♦ **Salbutamol** Nebuliser (could be given back-to-back).

3 ♦ Add **Ipratropium Bromide** Nebuliser.

*"**Salbutamol** and **Ipratropium** can be mixed in a solution and repeated)*

4 ♦ **Corticosteroids**

√ **Oral prednisolone** (either liquid or crushed tablets dissolved in water)

√ OR **IV hydrocortisone**.

5 ♦ **If still in asthma exacerbation, consider:**

	♠ **IV Magnesium sulphate (MgSO4):** *tried **first** before the following 2 options*. ♠ **IV** Salbutamol ♠ **IV** Aminophylline (unlikely to be the correct answer as it is given by seniors in severe life-threatening asthma exacerbations that have failed to respond to the max doses of bronchodilators and steroids) ◙ **Once there is a Silent chest** → Intubate. --- **Salbutamol is a short-acting beta$_2$ agonist (SABA)** **Ipratropium bromide is anticholinergic.** --- After giving O2, Salbutamol…etc, if the child develops tachypnea, SOP, drowsiness Request → **Arterial blood gas**. (To look for respiratory acidosis and manage accordingly)
Key 8	**DDx of Stridor in paediatrics**: *Acute epiglottitis* and *Croup* are mentioned above.

	Inhaled FB	♦ Symptoms depend on the site of impaction of foreign body. ♦ Features are of sudden onset. → coughing, choking, vomiting, stridor. → Laryngoscopy
	Laryngomalacia	♦ Congenital abnormality of the **Larynx**. √ ♦ Typically presents at 4 weeks of age with → **Stridor**. ♦ Stridor can be worse on crying. ♦ Usually resolve within one year of life. ♦ Laryngomalacia is the most common congenital airway disorder and the most common cause of stridor in neonates. **Asked before:** **What structure is not fully developed at birth?** → **Larynx**.
Key 9	• Hx of travel, **WATERY Diarrhea** (Not-bloody), **Weight Loss,** abdominal pain, foul-smelling flatulence, bloating → **Giardiasis**	

♦ First line Investigation → **Stool microscopy** "for ova and parasite"

♦ Another investigation → Stool ELISA/ PCR

♦ First line Rx → **Metronidazole + Hygiene**.

Remember "from **Infectious disease** chapter":

A patient came from Kenya (a country in Africa) develops watery diarrhea with abdominal cramping.

The most likely organism ⟶ **E. Coli**.

A patient came from Kenya (a country in Africa) develops watery diarrhea with abdominal cramping. He also has foul-smelling flatulence and weight loss.

The most likely organism ⟶ **Giardia**.

▫ Traveller's diarrhea that is usually of a short period and self-limited in 72 hours (especially Hx of a travel to Africa) ⟶ **E. coli**.

▫ Hx of travel, WATERY (Non-bloody) diarrhea, Weight Loss (If chronic Giardiasis), abdominal pain and bloating (Symptoms for > 10 Days) ⟶ **Giardia**.

¤ Hx of travel ⟶ Prodrome: HIGH Fever (40 degrees), Headache, Myalgia ⟶ Followed by BLOODY Diarrhea ⟶ **Campylobacter jejuni**.

Other Important Notes on Diarrhea:

- Bloody diarrhea → **Campylobacter jejuni** → Followed by **Shigella**.
- Traveller's diarrhea → **E. coli**.
- Diarrhea in Paediatrics → **Viral** (**Rota Virus**).
- Diarrhea (GIT infection) + Weakness + Areflexia → **Guillain-Barre Syndrome**.
- Diarrhea + Renal Impairment + Hemolysis → **Hemolytic Uremic Syndrome**.
- Diarrhea followed by RUQ Pain → **Amoeba**.
- Watery Diarrhea after camping or long travel in Europe → **Giardia**.
- Diarrhea after long-term antibiotics → **Clostridium Difficile** (**Pseudomembranous colitis**)

  Rx → **Oral Metronidazole** or **Oral Vancomycin**.
- Diarrhea after eating Eggs or Chicken → **Salmonella**.
- Diarrhea just hours after a meal → **Staph**. **Toxin**.
- Diarrhea in a bedridden-patient (e.g. handicapped) with stony hard stools → **Fecal impaction**.

Remember, **bloody diarrhea** → **CSS** → **C**ampylobacter – **S**higella – **S**almonella.

Key 10

Breath-Holding Spells → Reassure

A **toddler** (mainly 6 months – 2 years old)

(± **Minor injury** – **pain** – **fear**), followed by:

→ ± **Crying** → **Loss of consciousness** (for 1-2 minutes) → **Rapid Recovery**

√ **Either** → **Blue breath holding spells** (the young child turns **Blue** and stops breathing).

√ **Or** → **Reflex anoxic seizures** (= **Reflex asystolic syncope**) (= **White breath holding attacks**) (The young child stops breathing and turns **Pale**).

• Note, in Reflex anoxic seizures, a toddler is rigid and pale and may have upward eye deviation + Colonic (Jerky) movements. **HOWEVER**, there is **no biting of tongue.**

• Reflex anoxic seizures do not cause **Tongue Biting** (an important point to differentiate it from epilepsy).

• We do not usually need to differentiate blue breath-holding spells from Reflex-anoxic seizures as the management is the same.

• Nonetheless, in the former (**blue breath-holding spells**), the toddler usually **cries vigorously** and turns into **blue**

	whereas, in the latter (**Reflex anoxic seizure**), he would attempt to cry followed a **minor injury** (e.g. **falling**) but may not be able to cry, and he turns to **pale**. ◙ **Management in both cases:** √ **Reassurance**. √ Advice parents to place their child in the recovery position until the episode ends (usually less than 1-2 minutes). √ Check Ferritin and treat iron deficiency anemia if present.
Key 11	*5-Week-old baby with prolonged jaundice presents with pale stool, dark urine, liver enlargement and low weight for age.* → **Biliary Atresia**. Request → **Direct "Conjugated" Bilirubin** → Surgery. These are features of **obstructive jaundice** (**Pale stool**, **Dark Urine**) **Biliary Atresia** is a common cause of "Prolonged" Neonatal Jaundice. *8-Week-old baby presents with jaundice, Yellow stool, Pale urine, liver enlargement, low weight, difficult feeding and Vomiting.* → **Galactosemia**.

Here, **pale** urine → (**not** obstructive jaundice → **not** biliary atresia).

Vomiting, poor feeding, FTT and Prolonged jaundice → Galactosemia.

Causes of prolonged jaundice (persists for weeks "> 14 days")

√ **Biliary atresia** → "**Obstructive Jaundice**" → ↑ **Conjugated "Direct" Bilirubin** → **Pale stool**, **Dark urine**, hepatomegaly, FTT (Failure to Thrive).

√ **Congenital Hypothyroidism** → **Jaundice**, **Constipation**, **Cold mottled dry skin**, Hypoactive, Floppy muscles, FTT (**Failure to Thrive**), **Protruded tongue**, **flat nose**, **widely set eyes**

→ Give Oral Levothyroxine until 2 years of age.

√ **Breast milk jaundice**

√ **Galactosaemia** → Vomiting, Difficulty feeding, Diarrhea, Jaundice, FTT.

√ **Urinary tract infection** (UTI)

√ **Congenital infections** e.g., CMV, toxoplasmosis

Key 12

Duchenne Muscular Dystrophy (DMD)

From the genetics chapter

◙ **X-linked Recessive** → a **Male** child has 50% to **inherit the gene** if his mother is a carrier.

X-linked recessive only affects males.

◙ For PLAB 1, criteria for DMD:

√ 4-8 YO ♂ (boy) who started to walk late (≥ 18 months instead of 12 months)

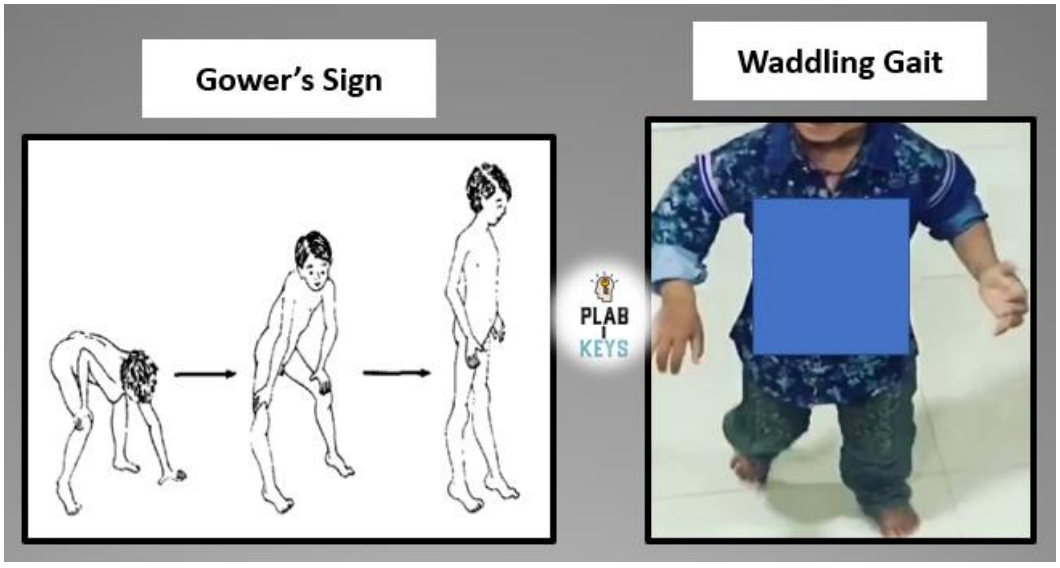
√ Gower's sign → the boy uses his hands to push on his legs to stand.

√ Proximal Muscle weakness.

√ Waddling gait (he cannot run).

√ (↑) CK "Creatine Kinase", ALT, AST.

√ (±) Respiratory and/or Cardiac manifestations.



◙ Diagnosis:

→ Initial test → **CK** "Creatine Kinase)

→ **Muscle Biopsy**

→ **Genetic Testing** (Obligatory after +ve muscle biopsy).

◙ Important Note:

DMD has a mutation defect in Dystrophin protein which lies in **Striated muscles**.

◙ X-linked **Recessive** Conditions:

DMD ▌Haemophilia

Key 13

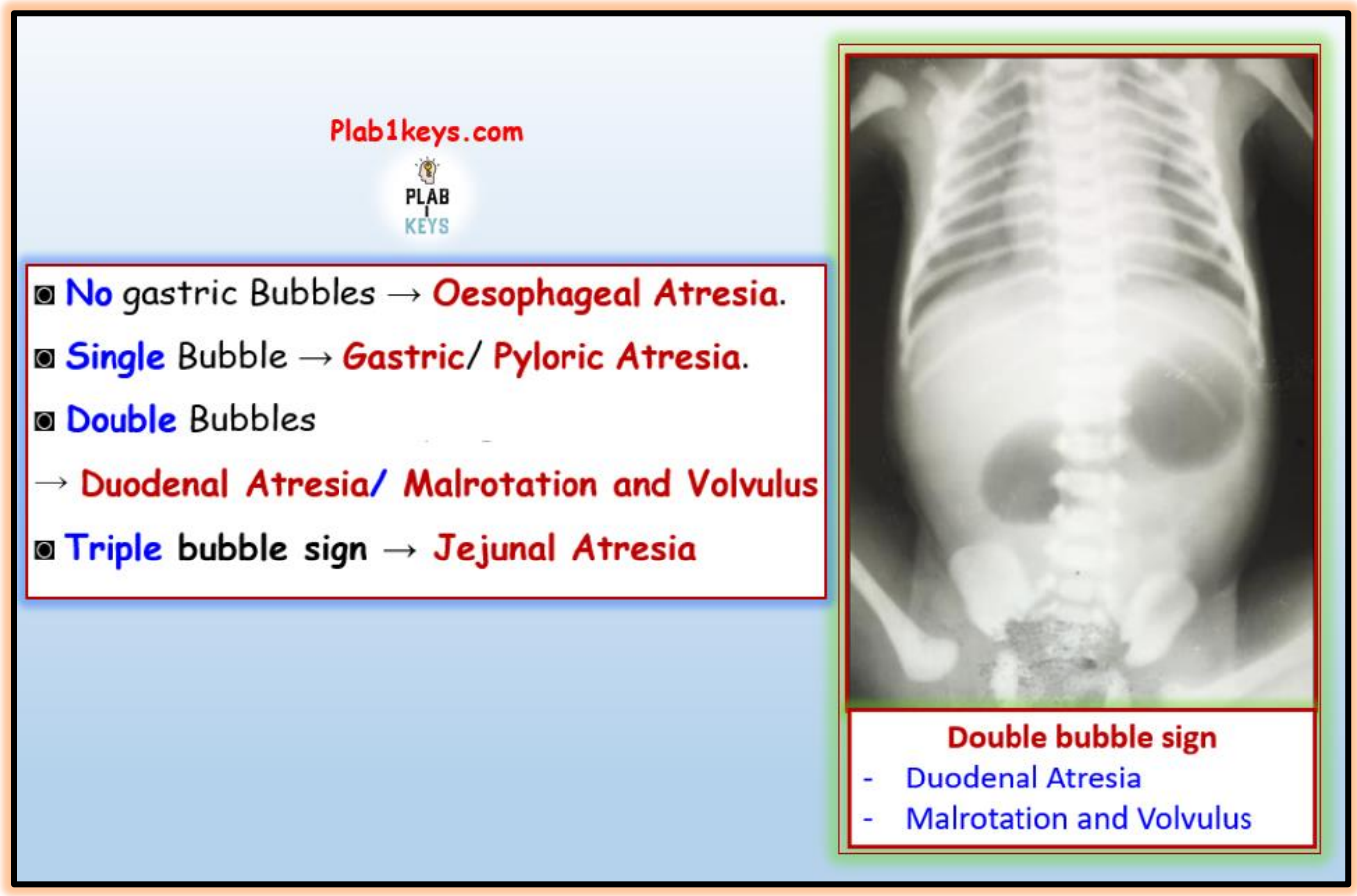
From the genetics chapter

Autosomal Recessive	Autosomal Dominant	X-Linked Recessive
If **Both** Parents are **Carriers** → • **25%** chance of a child to be **affected**. • **50**% chance of a child to be a **Carrier**.	If **One** parent is **Affected** → **50%** chance of a child to be **affected**. → **25%** chance of a Grandchild to be **affected**.	If **Mother** is **Carrier** → **50%** chance of a **Male** child to be **affected**.
Cystic Fibrosis	Huntington's Disease	Duchenne Muscular Dystrophy (DMD)

	Autosomal dominant with anticipation)	
Congenital Adrenal Hyperplasia (21-hydroxylase Deficiency).	Neurofibromatosis	Haemophilia
Thalassemia	Autosomal Dominant Polycystic Kidney Disease (ADPKD)	
Sickle Cell Anemia	BRCA 1 gene (Autosomal dominant with incomplete penetrance)	

Key 14

Double bubble sign can be seen in duodenal atresia and in volvulus as well.



Key 15

Very Important DDx of Paediatrics' Abdominal Conditions

♦ Case (1) ♦

- **Sudden** onset of **green**, **bilious vomiting** in a neonate
- (+) **Blood per rectum**.
- (±) Double bubble sign on X-ray

→ **Malrotation and Volvulus**.

√ Dx → **Abdominal X-ray**, **Barium enema**.

√ Rx → **ABCDE**, **NGT decompression**, **refer to paediatrics surgery for laparotomy and resection**.

♦ Case (2) ♦

◙ **Projectile**, **non-bilious vomiting** "≈ 30 min" after a feed in a 3-8 weeks neonate

(±) Palpable **Almond-seized mass** in the upper abdomen

(±) hypochloraemic, hypokalaemic alkalosis (**Metabolic alkalosis: ↓Cl^-, ↓ K^+**).

(±) A hungry baby who wants to feet regardless of the constant vomiting.

→ **Pyloric Stenosis**.

√ Dx → **Abdominal Ultrasound → Thickened pylorus** important √

√ **CAREFULL!** The most **URGENT** Next step → Serum Potassium (K+).

"**Remember** that **repetitive projectile non-bilious vomiting especially after feeding** in **pyloric stenosis** can cause →

hypochloraemic hypokalemic alkalosis (low Cl-, Low K+) which prompts urgent correction.

♠ Therefore, if the question asks about the **next step** or **the most URGENT step**, the answer would be → (**measure serum K^+**),

♠ whereas if the question asks about an investigation for **Diagnosis**, the answer will be → "**Abdominal Ultrasound**".

√ Rx → Correct dehydration and electrolytes.

→ NGT (Nasogastric tube).

→ **Ramstedt Pyloromyotomy**.

♦ Case (3) ♦

◙ Infants **6-36 months** old with paroxysmal:

Severe abdominal colicky **pain, + Irritable + CRYING**

(±) bloodstained stool (**rectal bleeding**) – **'red-currant jelly'** – "late sign".

(±) **sausage-shaped mass** in the right upper quadrant (ileocecal).

→ **Intussusception**.

√ Dx → Abdominal Ultrasound → Target sign/ Doughnut sign.

√ Rx → Mechanical reduction (first line: reduction by air enema insufflation.

2nd: reduction by barium enema).

If fails→ Surgical reduction (laparotomy).

• **Important Note:**

√ A rare complication of Henoch-Schonlein Purpura (HSP) is intussusception.

√ **HSP** → **PAAN**: non-blanching **P**urpura (mainly on buttocks and lower limbs ± **A**rthralgia, **A**bdominal pain, **N**ephropathy (Hematuria, Proteinuria).

√ So, if a baby has pruritic rash (purpura), abdominal pain and arthralgia and then develops severe abdominal pain, rectal bleeding and irritability:

Think → Intussusception (as a complication of Henoch-Schonlein Purpura HSP). √.

♦ Case (4) ♦

◙ **Painless bleeding per rectum in a Male child aged 2-3 YO**

→ **Meckel's Diverticulum**.

√ Dx – **Initial** modality → **Radioisotope Scan**.

√ Dx – **Definitive** → **Laparotomy**.

√ **Rx** → **Surgical Resection**.

√ **Other hints** for Meckel's (**Rule of 2**):

2-3 YO "mainly male" ▌**2 inches long** ▌**2 feet away from ileocecal valve**.

Remember that in Intussusception and Volvulus → Painful.

♦ Case (5) ♦

Meconium ileus is present (**not being passed in the first 2 days of life**)

+ **Bilious greenish vomiting** + Abdominal distension + Crying

→ **Hirschsprung's disease**. To confirm → X-ray or rectal biopsy.

Key 16

Viral Rashes in Paediatrics

Measles / **Rubella** / **Roseola** / **Parvovirus B19** / **Head, Foot and Mouth Disease**

Treatment in all these cases → **Supportive** + **Reassurance**

Measles

(•) **Fever, Irritability**

(+) **Rash** "often itchy", **begins on Face/ Neck** and then spreads to body

(+) **Koplik spots** "red with **white centre spots** -***grain of salt***- on **buccal mucosa**"

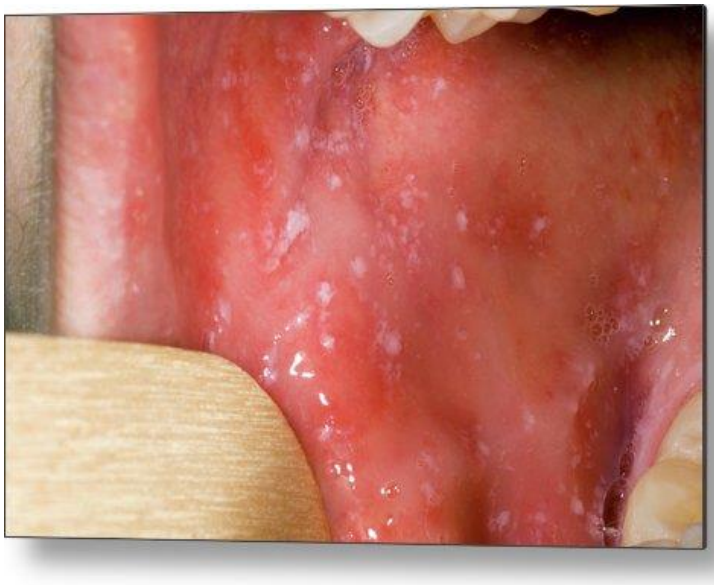
(+) **URTI** (runny nose and sore throat)

(+) **No** cervical Lymphadenopathy

→ **Measles** = Rubeola

Note, Measles is also called "Rubeola" | Rubella is also called "German Measles"

Management? →

	√ Mainly ***supportive*** (e.g. Paracetamol/ Ibuprofen for pain and fever). √ A ***notifiable*** disease √ **If these are not given in options, pick →** **Reassurance** (as no antibiotics or steroids are required; it usually resolve spontaneously in a week or so). **Measles → "K": Koplik spots, Cough, Coryza (runny nose, sore throat), Conjunctivitis.**  **Koplik Spots (grains of salt) – buccal mucosa – Measles**
Key 17	**Rubella** (•) **Low-grade fever** (+) **Rash**: **maculopapular**, initially on the face (before spreading to the whole body), usually fades by the 3-5th day

	(+) **Lymphadenopathy**: cervical, suboccipital and postauricular. (±) **Froschheimer's Spots on "soft palate" [Red petechiae in the mouth]** Management → The same as measles. **Note, Rubella presents similar to Measles but with** √ **Enlarged LNs**. √ **Froschheimer's Spots on "soft palate"** not "buccal mucosa".
Key 18	**Roseola** (**Roseola infantum**) **Sudden HIGH Temperature followed by non-itchy rash on CHEST or legs then spreads to body. (√)** asked in September 2019 Plab 1 exam. --- **Erythema infectiosum = (fifth disease) = Parvovirus B19** **Children: Slapped cheek appearance (bright red rash on both cheeks, may spread to body, may be itchy if involves the feet soles)** --- **Hand, Foot and Mouth Disease**.

	Coxsackie Virus. "important √" **Painful ulcers on tongue** (+) **grey blisters on hands and feet**. The management of these Viral Rash Conditions is **Supportive + Reassurance**. **HOWEVER,** **If you suspect Meningitis (rash, neck stiffness, photophobia, uncontrollable fever), the management will be completely different!**
Key 19	♦ **Urine Dipstick testing** should be used for infants and children > 3 months old with suspected UTI. ♦ If both **leukocyte esterase** and **nitrite** are **negative**: do not start antibiotic treatment, and do not send a urine sample for microscopy and culture. ♦ **If leukocyte esterase or nitrite, or both** are **positive** → start **antibiotic** treatment and **send a urine sample for culture (Midstream catch if mature enough)** √ A **clean catch urine sample** = **Midstream catch** is **the method of choice** for urine collection recommended by NICE. Do not be surprised if you have to choose "**Clean catch** urine sample for culture" in **a 2 YO child** :D Good luck trying 😊 √ If a clean catch urine sample is not possible (Not toilet-trained children):

	♦ A **collection bag** attached to cleaned genitalia can be used. However, if the genitalia are not cleaned and culture is delayed, there can be a high incidence of false positive results (85-99%). ♦ Use other non-invasive methods such as urine collection pads but do not use cotton wool balls, gauze or sanitary towels. ♦ Alternatively, a (**urine catheter)** sample or (**Suprapubic Aspiration**) SPA of urine may be collected where sufficient experience and resources exist.
Key 20	**Paediatric Developmental Milestones** In the exam, if you see one of the following → **Refer for "Developmental Milestones Assessment"** as they represent the age limit after which, it is considered abnormal. • **No smile by 8 weeks of age (2 months).** → **Delayed Social Development.** • **No eye contact by 3 months of age.** → **Delayed Social Development.** • **No holding objects placed in hand by 5 months of age.** → **Delayed Fine Motor Development.**

- **No reaching for objects by 6 months of age.**

→ **Delayed Fine Motor Development.**

- **No transferring objects between hands by 9 months of age.**

→ **Delayed Fine Motor Development.**

- **Cannot sit unsupported by 12 months. (but if he cannot stand unsupported by 12 months, it is still considered as normal).**

→ **Delayed Gross Motor Development.**

- **Cannot walk by 18 months.**

→ **Delayed Gross Motor Development.**

- **No single meaningful word by 18 months.**

→ **Delayed Verbal "Language" Development.**

- **Only says dada and mama at 24 months ▌Not putting 2 or more words together like (car seat), (Mama milk) in a sentence at 24 months:**

→ **Delayed Verbal "Language" "Speech" Development.**

- **Cannot run by 30 months (2.5 years)**

→ **Delayed Gross Motor Development.**

√ If parents are concerned about speech at anytime

→ **Refer for hearing test.**

Otherwise → **Reassure / Normal Development.**

Remember,

The above are the commonly asked concerning milestones.

However, **for your knowledge and interest**, we have provided the full Paediatric developmental milestones (if you have time, go over them).

Gross Motor Development

Newborn	Limbs flexed, symmetrical pattern Marked head lag on pulling up
6 – 8 weeks	Raises head to 45 degrees in prone (tummy-time)

6 – 8 months	Sits without support (initially with a round back, then eventually with a straight back by 8 months) ***Limit age: 9 months***
8 – 9 months	Crawling
10 months	Stands independently Cruises around furniture
12 months	Walks unsteadily – a broad gait, with hands apart ***Limit age: 18 months***
15 months	Walks steadily
2.5 years	Runs and jumps

Vision and Fine Motor Development

6 weeks	Follows moving object or face by turning the head (fixing and following) *Limit age: 3 months*

4 months	Reaches out for toys ***Limit age: 6 months***
4 – 6 months	Palmar grasp
7 months	Transfers toys from one hand to another ***Limit age: 9 months***
10 months	Mature pincer grip *Limit age: 12 months*
16 – 18 months	Makes marks with crayons
14 months – 4 years Brick building	Tower of three – 18 months Tower of six – 2 years Tower of eight or a train with four bricks – 2.5 years Bridge (from a model) – 3 years Steps (after demonstration) – 4 years

2 – 5 years Pencil skills *Drawing without seeing how it is done.* *Can copy 6 months earlier.*	Line – 2 years Circle – 3 years Cross – 3.5 years Square – 4 years Triangle – 5 years Diamond – 6 years

Hearing, Speech and Language Development

Newborn	Startles to loud noises
3 – 4 months	Vocalises alone or when spoken to, coos and laughs *"aa, aa"*
7 months	Turns to soft sounds out of sight Polysyllabic babble (*"babababa, lalalalala"*)

7 – 10 months	Sounds used indiscriminately at 7 months Sounds used discriminately to parents at 10 months *"Dada, Mama"*
12 months	Two to three words other than 'Dada' or 'Mama' Understands name *"Drink"*
18 months	6-10 words Is able to show two parts of the body *"Where is your nose?" – Baby will point*
20 – 24 months	Joins two or more words to make simple phrases *"Give me teddy"*
2.5 – 3 years	Talks constantly in 3 – 4-word sentences Understands 2 joined commands *"Push me fast Daddy"*

Social, Emotional and Behavioural Development

6 weeks	Smiles responsively *Limit age: 8 weeks*
6 – 8 months	Puts food in their mouth
10 – 12 months	Waves bye-bye, plays peek-a-boo
12 months	Drinks from a cup with two hands
18 months	Holds spoon and gets food safely to mouth
18 – 24 months	Symbolic play *Limit age: 2 – 2.5 years*
2 years	Toilet training: dry by day Pulls off some clothing
2.5 – 3 years	Parallel play Interactive play evolving Takes turns

Key 21

Celiac Disease

- Autoimmune, Malabsorption disease, results due to sensitivity to the **Gluten** (which is a protein).

- Eating gluten diet (eg, **Rye**, **Wheat**, **Barley**) → **Villous atrophy** of the GIT → Malabsorption → Iron deficiency Anemia, Folic Acid and Vit. B12 Deficiency, malabsorption of fat.

◙ Manifestations:

- Chronic or Intermittent **Diarrhea**.
- **Steatorrhea** (fatty stools "**Smelly, difficult to flush**" due to fat malabsorption).
- **Stinking** (bad-smell) **stools**
- **Abdominal discomfort, Bloating - Distension-, Nausea and Vomiting.**
- **Wight Loss. (Failure to thrive)** ***imp v.***
- **Anemia Types:**

Iron deficiency anemia (the most common. The baby is patient is pale), followed by **Folate deficiency** then **Vitamin B12 deficiency**.

- Manifestations of anemia eg, **Pallor, Fatigue**.

◙ Complications: ***Osteoporosis*** / ***T-cell lymphoma*** (rare).

- **Association not to be forgotten** → ***Dermatitis Herpetiformis*****.**

◙ Diagnosis:

- Positive **TTG** and **IgA**. (First Line)

  (TTG= **Tissue TransGlutaminase Antibodies**) "**First-line**".

- Sometime, TTG will not be given in the options,

  Pick → **Anti-Endomysial Antibodies**.

- Also, **alpha-gliadin antibodies would be positive**.

If TTG is positive, **we need to confirm the diagnosis** of Celiac disease by a **Biopsy** →

- **Jejunal or Duodenal Biopsy.**

- **Villous Atrophy.**
- **Crypt hyperplasia**.
- ↑ inter-epithelial **lymphocytes**.

Important: for the biopsy to be accurate, the patient should re-introduce the gluten in his diet for 6 weeks before the biopsy.

◙ Treatment: → Gluten-free diet.

Example scenario:

A 24-year-old child (2-year-old) presents with his parents as he has been having a smelly loose stools and abdominal distention for the past few months. He is not being able to gain sufficient weight as well despite feeding well. He looks pale.

Steatorrhea (loose smelly stools) due to fat malabsorption, abdominal distension and failure to thrive (not gaining weight sufficiently) are features of celiac disease. Also, he is pale because of anemia (which is also prominent in celiac disease due to malabsorption).

Dx → **Celiac disease**.

Ix → **Tissue TransGlutaminase Antibodies**

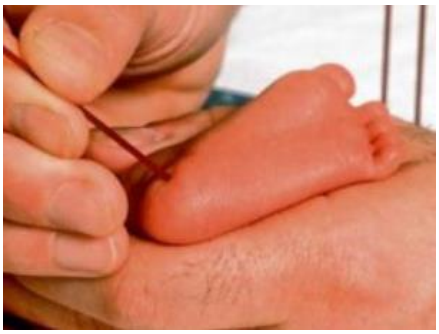
If not given → **Anti-Endomysial Antibodies**

Why not cystic fibrosis?

In CF, hints other than steatorrhea (malabsorption) would be given (eg, ***recurrent respiratory infections***, ***repetitive cough*** over the past few months ± Delayed growth and Abdominal distension). In this case, CF would be suspected and (***Sweat chloride test*** would be requested).

◙ In the UK, there is a neonatal screening test for CF (**Guthrie test**) using **heel-prick test**.

If positive → Confirm by Sweat test and Genetic testing for CFTR.



◙ If CF was not diagnosed during neonatal period and it is suspected in an older individual (eg, 1 YO) → Perform **Sweat Test "First"** or **Genetic testing for CFTR**.

	Important, ◙ **Why are there repeated pulmonary problems in cystic fibrosis patients**? → **Due to higher Viscosity of mucous**. ◙ **What is the most commonly organism affecting Chest in Cystic fibrosis**? → **Staphylococcus aureus**. Followed by Pseudomonas ***Please note that the "Cystic fibrosis" topic is fully covered in the Genetic Chapter.***
Key 22	◙ A child presents with **repetitive cough**, low percentile for weight and height (**Failure to thrive**), **Steatorrhea** (Greasy, bulky and smelly stools that float), rectal prolapse (due to bulky stool), **recurrent chest infections**. → Suspect **Cystic Fibrosis** and perform → chloride **Sweat Test**.
Key 23	A child with **multiple admissions** to hospital with **weight loss** and **infections** which **recover after admission and re-occur when discharged**. Suspect → **Neglect** *The child is likely being neglected at home "no sufficient nutrition or care".*
Key 24	♦ **Psychiatrists** → **prescribe psychotropic medications**. ♦ **Psychologists** → **talk therapy**.

A child has been recently diagnosed with type 1 DM. since then, he is sad, not cooperating, socially isolated. Where to refer?

→ **Psychologist**

(He needs some ***talk therapy*** so he can accept his diagnosis of insulin dependent diabetes and gets back to life).

Key 25

Important Notes on Hernias

◙ **Inguinal Hernia** → **ABOVE** and Medial (some references say lateral) to the pubic tubercle.

◙ **Femoral Hernia** → **BELOW** and lateral to the pubic tubercle.

◙ Inguinal Hernia → Impulse on cough, reducible

◙ Femoral Hernia → rarely impulse on cough + Irreducible as the femoral canal is narrow.

◙ **Strangulated** and **Incarcerated** hernias → **Irreducible, very painful, require urgent surgery.**

	◙ RFx of **Inguinal Hernia** → **Male** sex, **Lifting heavy objects**, **old age**, **chronic cough**, **previous abdominal surgery**. ◙ **Indirect inguinal hernia** → **Passes through the deep and the superficial inguinal ring** (Passes through the entire length of the inguinal canal) and lies **LATERAL** to the inferior epigastric artery. ◙ **Direct inguinal hernia** → **Passes through the Posterior wall of the inguinal canal** "directly". It does not pass through the deep and then the superficial ring of the inguinal canal as the indirect hernia does.
Key 26	√ **Uncomplicated** inguinal hernia treatment? → "**Elective" surgery** √ If complicated "incarcerated, **strangulated** red painful irreducible"? → **"Emergency" surgery**. ♦ If **< 10 YO** → **Herniotomy**. ♦ If **> 10 YO** → **Herniorrhaphy** (reinforcing the abdominal wall with a **mesh**). ◙ **Signs of Strangulated Hernias** *Pain* / *Fever* / *Inflammation* / *Nausea and Vomiting* /

	Features of *Intestinal Obstruction* (*Abdominal Pain*, *Distention*, *Constipation*). ◙ **Irreducible** inguinal hernias in children warrant **Emergency Surgery**. ◙ Concomitant **Orchidopexy** is required **if** one or both testes are **impalpable** in scrotum or **incarcerated**.
Key 27	**A child – Nasal Speech – Snores heavily at night – Breathing through mouth** √ **Dx** → **Obstructive sleep apnea (OSA)** √ Since most cases of OSA in children are due to enlarged tonsils and adenoids → **Refer to ENT Surgeon**. √ **Ix of choice** → **Polysomnography**. **Polysomnography** is also called a **sleep study**, is a comprehensive test used to diagnose sleep disorders. Polysomnography records brain waves, oxygen level in blood, heart rate and breathing, as well as eye and leg movements during the study. Note, children with OSA may be active during the daytime while adults with OSA (obsess) are usually fatigued during daytime and may fall asleep.

Key 28

A bite of psychiatry:

◙ **Tourette's syndrome** → **Repetitive multiple Tics** (motor + vocal), 6-13 YO child.

• **Examples**:

√ Unable to sit still, constantly blinking, making grunting noises, rubbing fingers.

√ A child yelling in class intermittently, shouting expletives.

√ **ADHD** "Attention Deficit Hyperactivity Disorder) frequently co-occurs in children with Tourette Syndrome → inattentiveness at class.

Remember, **Tics → Tourette**

◙ **Asperger Syndrome** → Affects **S**ocial interactions + behavioural problem.

◙ **Cotard's syndrome** → delusion of being already dead! (I'm dead)!

◙ **Rett's syndrome** → Normal development until 2-3 YO. After that, a **Re**gression in motor, social, language, coordination skills occurs.

◙ **Ekbom's Syndrome** → Delusion of Parasite infestation. (I am infested by parasites).

♠ ***Do you remember restless-leg syndrome = (Willis-Ekbom Syndrome) from the CNS chapter?***

♠ ***A person feels as if there are insects crawling over his lower limbs, and when moving his legs, he gets a relief.***

√ Try to link "insects", "parasites" in both **Ekbom** and **Willis-Ekbom**; however, they are different.

√ Remember, in Restless-leg syndrome (Willis-Ekbom Syndrome):

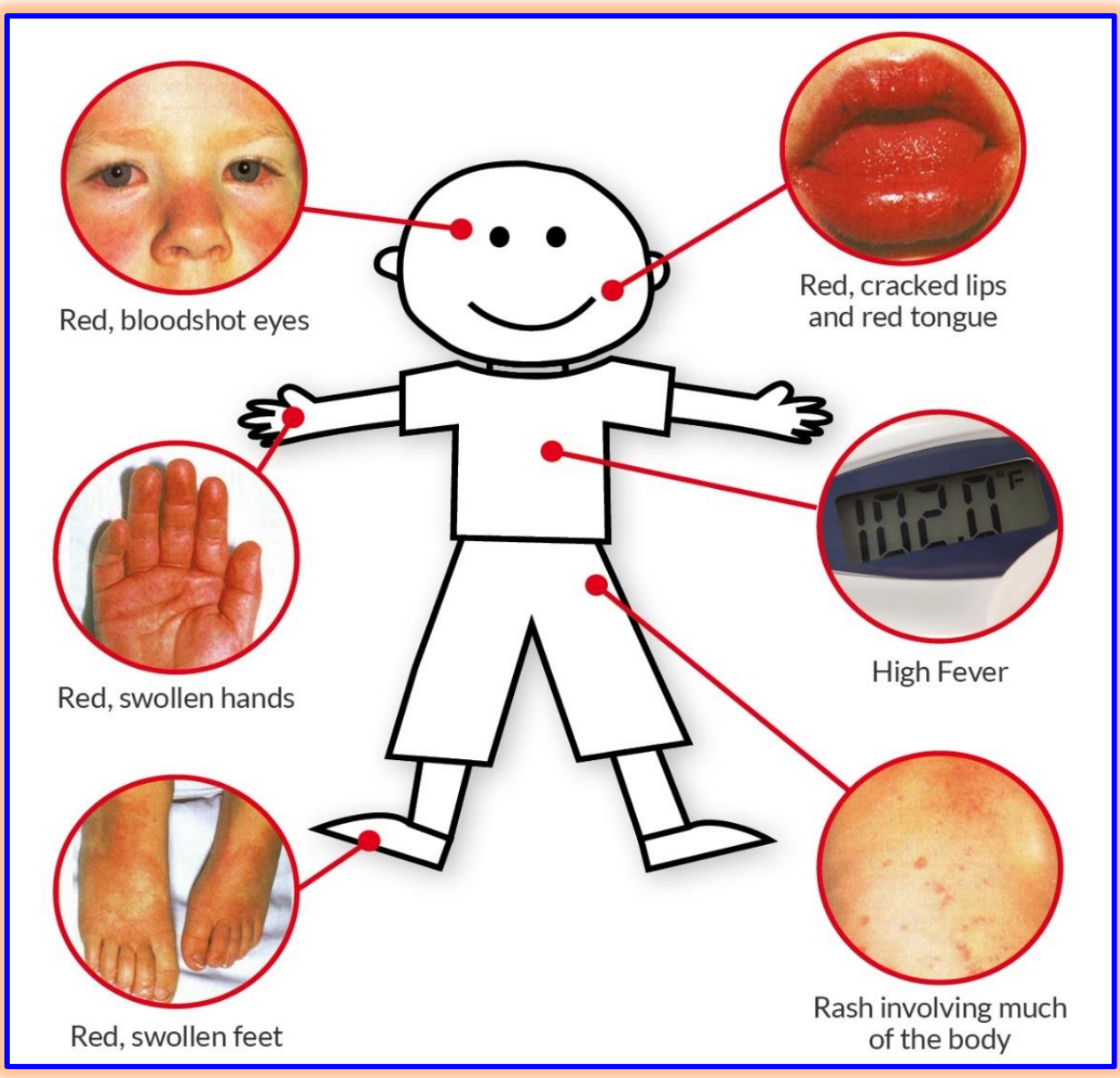
→ **Check iron (ferritin)**

♦ **If low** → Give iron supplements (even if Hb is normal, what matters is ferritin)

♦ **If ferritin is normal** → Give **Dopamine agonist**

Do not worry for now, these and more psychiatric conditions will be mentioned and explained in more details and examples in the Psychiatry chapter.

Key 29	**Kawasaki Disease** → Febrile systemic **vasculitis** in children < 5 YO.



◙ No specific diagnostic Test

◙ Diagnosed clinically by:

√ **High-grade fever (≥39 C) which lasts for > 5 days**.

Fever is characteristically resistant to antipyretics

(+) at least 4 of the following.

√ Bilateral, non-exudative Conjunctival injection (conjunctivitis)

√ Bright red, cracked lips

√ Strawberry red tongue

√ Painless Cervical lymphadenopathy

√ Red palms of the hands and the soles of the feet which later peel -desquamation-

√ Polymorphous Rash

Mnemonic → CRASH BURN.

Conjunctivitis – Rash – Adenopathy – Strawberry tongue – Hand foot erythema – Burning High Fever

◙ **Complications →** **Coronary Artery Aneurysm √ important "asked"**

◙ **Management → aimed at preventing aneurysm.**

♦ **High-dose aspirin**. (Low dose aspirin is given after settling of fever).

♦ **IV immunoglobulin**. (If given early → ↓ risk of coronary artery aneurysm).

♦ **Echocardiogram** (rather than angiography) is used as the initial screening test for coronary artery aneurysms.

	• It is important, for your general medical knowledge, to know that the use of Aspirin should normally be avoided in children due to the risk of **Reye's syndrome** (***Encephalitis*** + ***Liver damage***). • Kawasaki disease is one of the few indications for the use of aspirin in children (to prevent Coronary Artery Aneurysm).
Key 30	**Scarlet Fever** ◙ The commonest organism → **Group A Streptococcus Pyogenes**. √ ◙ **Features**: √ **Fever**: typically lasts 24 to 48 hours √ **Sore throat** (a ***clincher*** to differentiate it from Kawasaki disease). √ **Rash** – fine punctate erythema ('pinhead') = (***Sandpaper-like rash***). Rash starts on trunk 12-48 hours after fever (***not on palms or soles***) and spreads to body. √ Others: • **Strawberry tongue**. • **Cervical LNs**. • **Tonsils may be covered with pale exudates** with red macules (Forchheimer spots)

◙ Management

√ **Oral penicillin V** for 10 days.

√ If penicillin allergy → **azithromycin**.

√ children can return to school 24 hours after commencing antibiotics.

√ scarlet fever is a notifiable disease.

◙ Some complications:

♦ Otitis media: the most common complication

♦ Rheumatic fever: typically occurs 20 days after infection

(♦) **Kawasaki disease** is not an infection; it is Vasculitis. Hence, we treat it using **high dose aspirin** and **IV immunoglobulins** for the fear of **aneurysms**.

(♦) **Scarlet fever** is bacterial infection (**Strept. Pyogenes**). Thus, we treat it with oral **penicillin V** (or **Azithromycin** if there is penicillin allergy).

(♣) **Kawasaki disease** → Fever that does not respond to antipyretics and lasts for 5 days or more + **4 of:** Conjunctivitis + Painless Cervical LNs + Strawberry Tongue/ Red Cracked lips + Red palms and soles with a later desquamation + Polymorphous rash.

	(♣) **Scarlet fever** → Fever + (**SORE THROAT**) ± [Sandpaper Rash, No redness of palms or soles, Painful Cervical LNs, **Tonsils covered with Pale exudates**].
Key 31	**Do not forget the diagnostic modality of the following:** ◙ **Malrotation and Volvulus** → **Abdominal X-ray (Double bubble), Barium enema** ◙ **Pyloric Stenosis** → **Abdominal Ultrasound** "Important √ **P-US**" ◙ **Intussusception** → **Abdominal Ultrasound → Target sign**
Key 32	If you remember from the infectious disease chapter, we would give Varicella Zoster Immunoglobulin (VZIG) to an infant with a peri-partum exposure to a varicella patient. **Important Elaboration** The meaning of (peri-partum exposure) is **either 7 days before or 7 days after the delivery**. Within this specified period, if a newborn comes in contact with varicella patients (e.g., his mother), we should **administer VZIG + isolation**.

Important, what if the exposure was 8 days or more after delivery?

→ **Observation + Advise the mother to continue caring for her baby**.

Key 33

Chicken Pox → Varicella Zoster Virus.

♦ **Very contagious** (**Mainly** → via **Respiratory** "**Airborne**" route) **(√)**

However, Varicella zoster virus can also be transmitted via direct contact with the vesicles.

Once the vesicles are dried and crusted → no transmission.

♦ **Infectivity:** **1-2 days Before** the rash appears, until **5 days After** the rash first appeared (**becomes non-infective when the rash dries and crusts**).

♦ **Presentation:**

√ **Fever** (38-39 C).

√ **Pruritic** "itchy" Rash: **macules** → **papules** → **vesicles** → and then **dry crusts**, starting on the face and spreading mainly on chest and back.

Q) When can a child with chicken pox return to a school?

A) **After the rash and vesicles are dried and crusted** (Usually **around 5 days** after the onset of the rash).

◙ **Management "Important" √**

• Generally, in a healthy child < 12 YO → **Reassurance** + **Supportive measures** (such as paracetamol for fever and sedating antihistamines and calamine lotion for itching [Self-Limiting Disease]).

HOWEVER

• If **superimposed infection** is suspected (e.g. **discharging pustules**, redness around the vesicles, **pinkish fluid secreted** from the lesions with **High Fever**)

→ Give **Oral Antibiotics**.

Updated UK Guidelines for Varicella-Zoster Immunoglobulin (VZIG) and Aciclovir Use in Adults

1. **Varicella-Zoster Immunoglobulin (VZIG)**:

- **VZIG** is no longer the first-line prophylaxis for pregnant women exposed to chickenpox. Instead, **oral Aciclovir** is recommended for non-immune pregnant women (VZV IgG negative) following exposure.

- **VZIG** is mainly reserved for **neonates** exposed within 7 days before or after delivery, or when antivirals are contraindicated (e.g., due to absorption issues or renal toxicity).

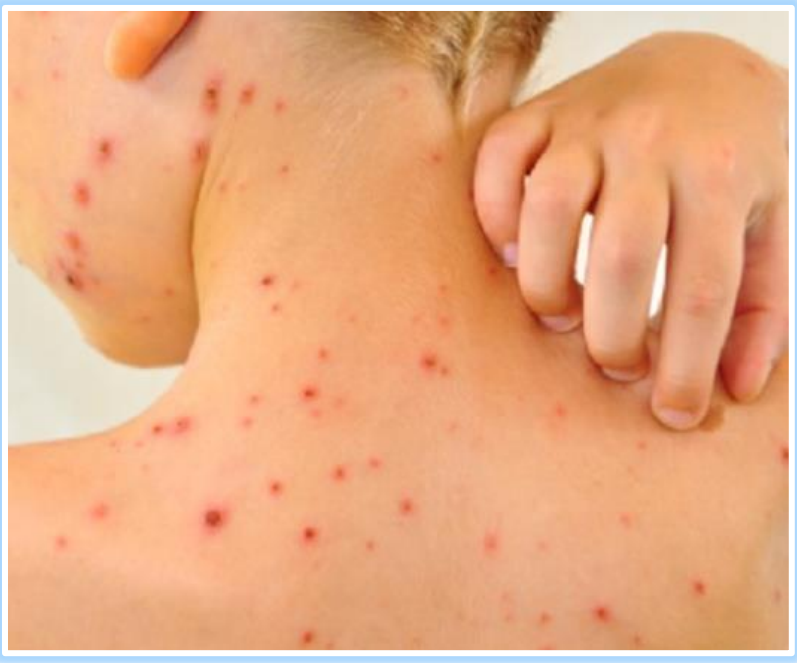
2. **Aciclovir**:

- **Oral Aciclovir** is the preferred treatment for pregnant women and immunocompromised individuals exposed to chickenpox or shingles, administered **7–14 days after exposure**. Also, for those who develop chickenpox.
- **IV Aciclovir** may be used in **severe cases** or when complications, such as pneumonia, arise. In milder cases, **oral Aciclovir** is started within **24 hours of rash onset** to reduce severity.

√ This reflects the most recent updates, with Aciclovir replacing VZIG in many cases and the use of oral or IV forms depending on the severity of the case. But most cases receive aciclovir orally unless severe or complicated.

√ Remember that in **children**, non-complicated chickenpox

→ Reassure + Supportive treatment (self-limiting).



Chicken Pox (Varicella Zoster)

Key 34

◙ Seizure + Fever → **Febrile seizure**.

♦ (Commonly in children from 6 months to 6 years old)

♦ (Often with FHx of febrile convulsions)

♦ (Typical generalised tonic-clonic seizures)

♦ (Careful! Investigate for meningitis as a source of this fever)

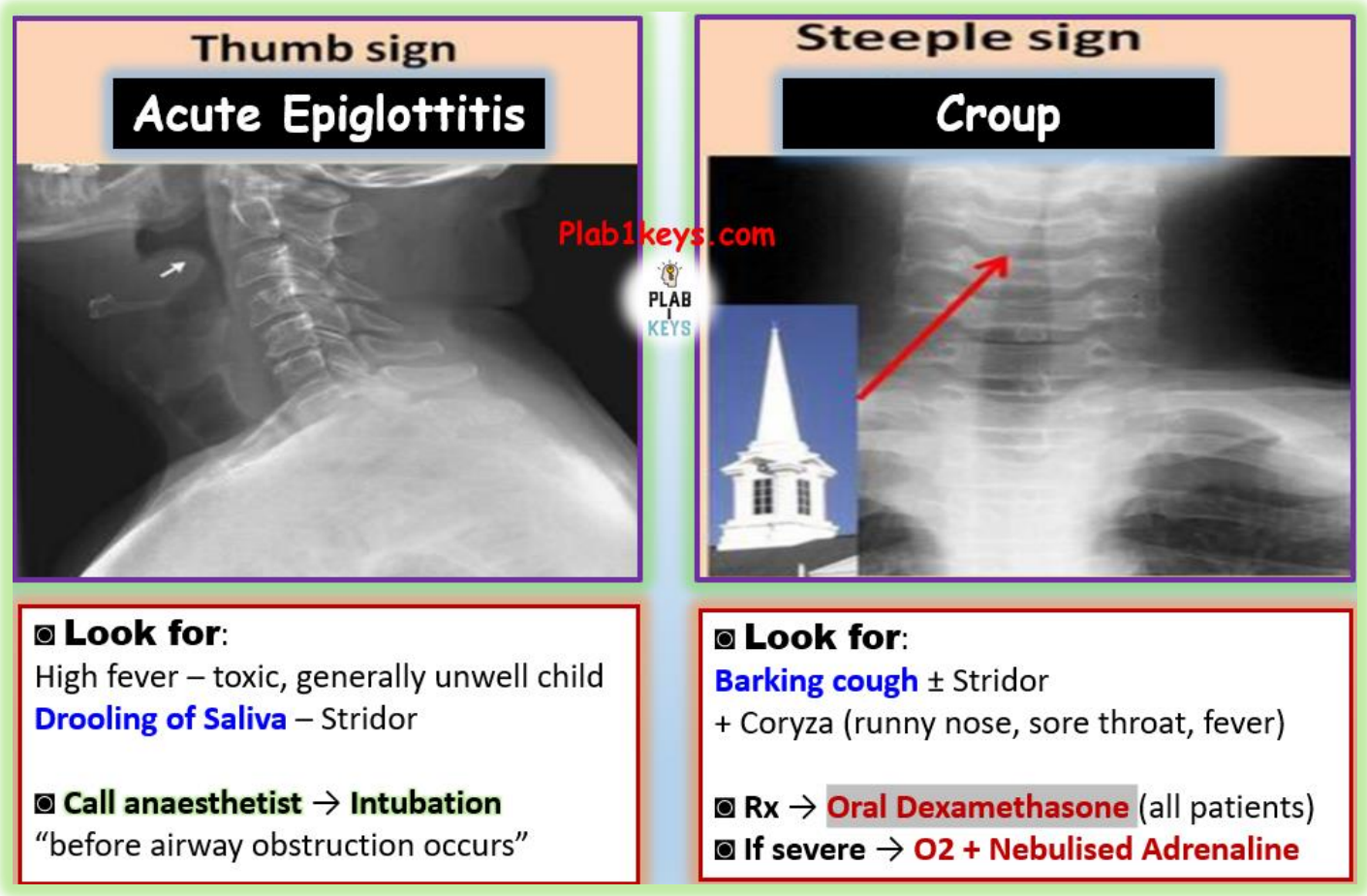
◙ Management of Febrile Seizure:

√ If a febrile seizure **lasts < 5 min** → **Antipyretics (e.g., Paracetamol)**.

	√ If **lasts > 5 min** → **Benzodiazepine** (eg, **Diazepam**, **buccal Midazolam**). (If IV line is inserted → **IV lorazepam**). ***Note**: If the question asks about a medication that would ((**STOP**)) the current ongoing seizure, the answer is a benzodiazepine (eg, diazepam, lorazepam).* ◙ **Important:** √ **1/3** of cases with a Febrile convulsion → will have **further episodes** of febrile convulsion (if they develop fever **before** the age of **6 years**). √ **1/3 of the cases who had Further episodes** of Febrile seizure → will develop **Epilepsy.** √ **(≈ 10% of all complex febrile convulsion cases would develop epilepsy**).
Key 35	***Points on hearing loss in paediatrics*** √ **Serous Otitis Media** (=**Glu ear**) (=**OM with effusion**) → **Conductive Hearing Loss**. √ **Aminoglycosides** (e.g. **Gentamicin**) **ototoxicity** → **Sensorineural Hearing Loss (SNHL)**.

	√ **Congenital infections** (e.g., **Congenital Cytomegalovirus CMV**) → **Sensorineural Hearing Loss (SNHL)**.
Key 36	**Following receiving vaccines, babies often develop fever that can be relieved with paracetamol.** → **Reassure and continue with the standard immunisation schedule**. **When to worry and to seek expert help?** → **If this fever persists for > 1 week**.

Key 37



Key 38

Remember, the following points are "**concerning**" **delayed milestones** that exceed the permit limit and thus we need to make a further step for the management such as assessment of mile stones/ refer.

- **Cannot sit unsupported at 12 months or more.**
- **Cannot walk at 18 months or more.**
- **No speech at all at 18 months or more (*refer for hearing assessment*).**

(**Important**, at any time, if there is a parental concern about hearing loss

	→ refer for hearing assessment (Audiology test) even if before 18 months old "e.g. 15 months old baby cannot say a single word including "dada" "mama"). Remember that (Serous – Otitis media with effusion is common in this age and it causes Conductive HL) ♦ Cannot run at 2.5 years (30 months) or more. ♦ Cannot Smile at 8 weeks or more. ♦ Cannot make eye contact at 3 months or more. ♦ Cannot hold objects placed in hand at 5 months or more. ♦ Cannot reach for objects at 6 months or more. ♦ Cannot transfer objects from a hand to another at 9 months or more.
Key 39	**Tricyclic Antidepressant Overdose (e.g. Amitriptyline) potentially life-threatening** Dilated pupils – Dry mouth – Dry flushed skin – Drowsiness – Hypotension – Urine retention – Severe Sedation – Tachycardia – Widened QRS • **ECG monitori— is essential**: Widened QRS, PR, QT and Broad complex tachycardia. ◙ **2 popular Scenarios in the exam (Important √)**

	1) A child taking his grandparent's medication and presented drowsy lethargic and tachycardic ± with myoclonic twitches **2) An elderly with terminal illness and wants to end his life, presented with dry skin and mouth, and dilated pupils.** ◙ **The most important immediate action → ECG Monitoring** ◙ As the patient is in severe **metabolic Acidosis** → **give an IV bolus of 250 ml Normal Saline (0.9%)** **(+) Sodium Bicarbonate (50 mmol IV slowly of 8.4%).** ♠ **N.B**. aim for pH of 7.5-7.55! ♠ Sodium bicarbonate will correct ECG changes and cardiac rhythm. ♠ Do not forget that in a patient with amitriptyline (TCA) overdose, if he is acidotic, 2 steps to be done: **1)** ECG monitoring. **2)** IV fluids including Sodium Bicarbonate (HCO3)
Key 40	**A prompt investigation is required in the following red flag delayed developmental milestones:** • **No smile by 8 weeks of age.**

→ **Delayed Social Development**.

- **No eye contact by 3 months of age.**

→ **Delayed Social Development**.

- **No holding objects placed in hand by 5 months of age.**

→ **Delayed Fine Motor Development**.

- **No reaching for objects by 6 months of age.**

→ **Delayed Fine Motor Development**.

- **No transferring objects between hands by 9 months of age.**

→ **Delayed Fine Motor Development**.

- **Cannot sit unsupported by 12 months. (but if he cannot stand unsupported by 12 months, it is normal).**

→ **Delayed Gross Motor Development**.

- **Cannot walk by 18 months.**

→ **Delayed Gross Motor Development**.

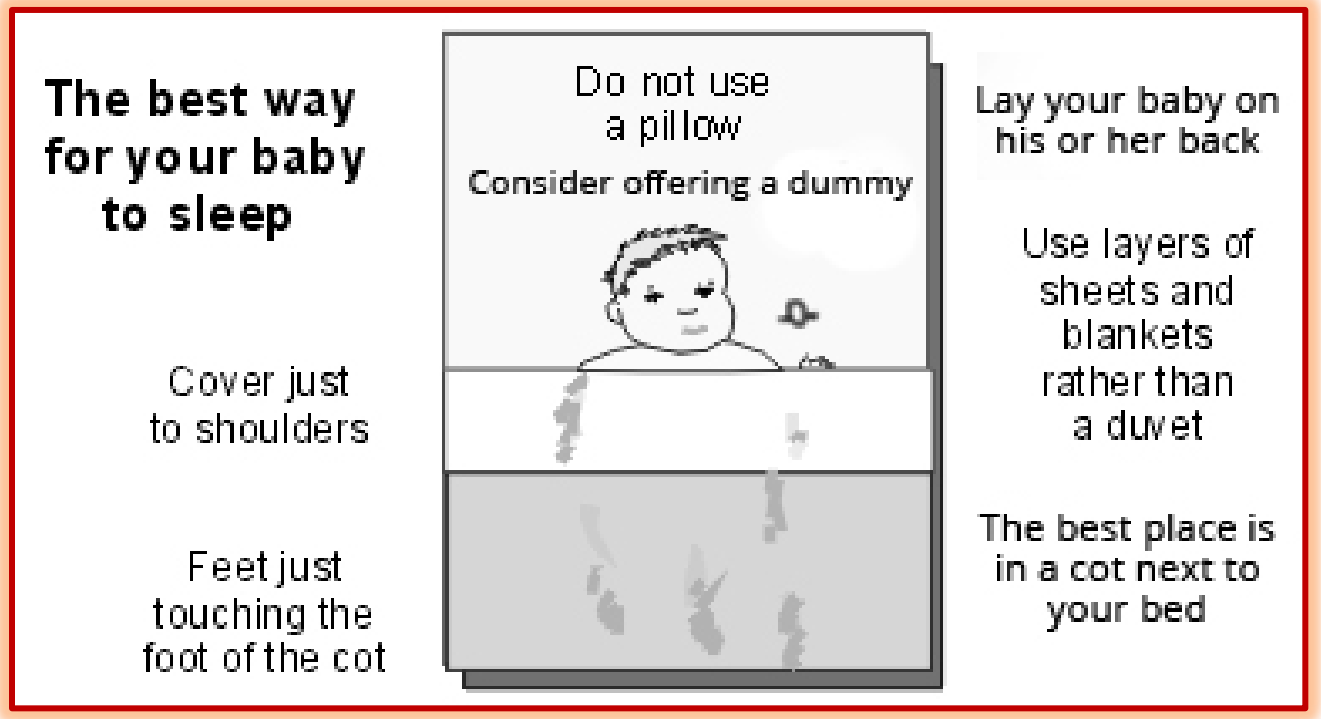
	• **No single meaningful word by 18 months.** → **Delayed Verbal "Language" Development.** • **Only says dada and mama on 24 months.** → **Delayed Verbal "Language" Development.** • **No sentences composed of 2-3 words by 30 months (2.5 years).** → **Delayed Verbal "Language" Development.** • **Cannot run by 30 months (2.5 years)** → **Delayed Gross Motor Development.** **√ If parents are concerned about speech → refer for hearing test.** **◙ Otherwise → Normal Development/ Reassure**
Key 41	**Sudden Infant Death Syndrome (SIDS)** Sudden infant death syndrome is the commonest cause of death in the first year of life. It is most common at 3 months of age.

Advice to Reduce the Risk of Sudden Infant Death Syndrome.

(**Advice to reduce the risk of Cot Death**).

Cot = a camp baby bed, particularly a portable, collapsible one.

- **Avoid prone sleeping (baby should sleep on his back, not his front or side).**
- **Avoid parental smoking near infants.**
- **Avoid parental sedative medications or alcohol at the time a baby sleeps.**
- **Avoid duvet (soft bedding) or pillows; only use blankets or sheets.**
- **Blankets should not be higher than the infants' shoulders.**
- **Do not heavily wrap a baby (avoid overheating).**
- **Avoid head covering.**
- **Place a baby on his back with his feet at the foot of the cot to sleep.**
- **Avoid sleeping with a baby on sofa or bed (avoid bed sharing).**



Key 42

A child with severe asthma after receiving O2, Salbutamol…etc, if the child develops tachypnea, SOP, Drowsiness

Request → **Arterial blood gas**.

(to look for respiratory acidosis and manage accordingly)

Key 43

Bronchiolitis

◙ The commonest organism → **Respiratory syncytial virus (RSV)**.

◙ Bronchiolitis is the **most common cause** of a serious **lower respiratory tract** infection in **< 1 YO** (90% are 1-9 months, with a peak incidence of **3-6 months**).

◙ Maternal IgG provides protection to newborns against RSV

◙ Higher incidence in winter

◙ Features

√ **Coryzal symptoms** (including mild **fever**) precede:

√ **Dry cough.**

√ **Increasing breathlessness.**

√ **Wheezing**, **fine inspiratory crackles** (not always present).

√ **Nasal flares.**

√ **Feeding difficulties** associated with **increasing dyspnoea** are often the reason for hospital admission.

◙ Management is largely → supportive

including humidified oxygen if low O2 saturation.

• **If severe manifestations** → admit for supportive Rx and observation.

	♠ Suspect bronchiolitis in infants < 1 YO (especially 3-9 months old) and even young children (first 2 years of life) who have NO Hx of Asthma, and present with cough, coryza, fever, SOB, WHEEZES and more importantly difficulty feeding and breathing. ♠ Always bear in mind that Bronchiolitis is very common in infants and young children. Supportive management is only required; No antibiotics! Sometimes if it is a mild bronchiolitis, pick Reassure, No Rx required!
Key 44	**After she has recently started taking horse-riding lessons, 8-year-old girl presents with her mother complaining of the presence of bright-red spots on her underpants.** The likely Dx → **Perforated hymen**. The next step → **Examine her genitalia in clinic**. Q) When should we examine her genitalia under **general anaesthesia**? → If the child refuses to be examined while the examination is critical such as in a suspected case of bleeding, severe trauma, foreign body. • ***So, we shall initially give an attempt for a normal examination at clinic.***

Key 45	A lymph node that is **increasing in size** and ≥ **2 cm** should be a worry even if with no other suspicious features (e.g. fever, weight loss). Thus, the step number 1 (**initial step**) to take is to request → **Full Blood Count and blood film** to look for any abnormalities that might suggest leukemia, lymphoma such as low Hb, low WBCs and low platelets in acute lymphoblastic leukemia. The next step after **FBC** would be **Ultrasound**. **Some causes of enlarged LNs in children** √ Haematological malignancies → e.g. ALL, lymphoma. √ CMV √ EBV √ Kawasaki disease √ TB
Key 46	**Remember,** **√** If a febrile seizure **lasts < 5 min** → **Antipyretics (eg, Paracetamol + Observation)** **√** If **lasts > 5 min** → **Benzodiazepine** (e.g., **Diazepam, lorazepam, Midazolam**).

***Note**: If the question asks about a medication that would ((**STOP**)) the current ongoing seizure, the answer is a benzodiazepine (eg, diazepam, lorazepam).*

Key 47

Neonatal Jaundice

♦ Jaundice in the **first 24** hrs is always **pathological**

◙ Causes of jaundice in the first 24 hrs

√ Rhesus haemolytic disease (Rh incompatibility)

√ ABO haemolytic disease (ABO incompatibility)

√ Hereditary spherocytosis

√ Glucose-6-phosphodehydrogenase (G6PD) deficiency.

◙ Jaundice in the neonate from the 2-14 days is common (up to 40%) and usually physiological. It is more commonly seen in breast fed babies

♦ If there are **still** signs of jaundice **after 14 days of delivery**, a **prolonged** jaundice screen is performed, including:

√ **Conjugated and unconjugated bilirubin**: the most important test as a raised **conjugated** bilirubin could indicate **Biliary atresia** which requires urgent surgical intervention

√ **Direct antiglobulin test** (**Coombs' test**)

√ **TFTs** (Thyroid function tests) → e.g. Congenital hypothyroidism

√ **FBC** and **blood film/ urine** for Microscopy, C&S and reducing sugars/ **U&Es** and **LFTs**

◙ Causes of prolonged jaundice (that persists for weeks "> 14 days")

√ **Biliary atresia** → "**Obstructive Jaundice**" → ↑ **Conjugated "Direct" Bilirubin** → **Pale stool**, **Dark urine**, hepatomegaly, FTT (Failure to Thrive).

√ **Congenital Hypothyroidism** → Jaundice, **Constipation**, **dry skin**, FTT (**Failure to Thrive**), **Protruded tongue**, **flat nose**, **widely set eyes**

√ **Breast milk jaundice**

√ **Galactosaemia** → Vomiting, Diarrhea, Jaundice, FTT.

√ **Urinary tract infection** (UTI)

√ **Congenital infections** e.g., CMV, toxoplasmosis

Examples,

◙ A breastfed newborn developed jaundice at the 2nd day of her life that pe[rsi]sted for 7 days (day 9 after birth) and she is now non-jaundiced and with normal weight and development.

→ **Physiological jaundice**.

If persisted for a prolonged period (e.g. > 6 weeks), we can suspect "Breast milk jaundice" which is one of the causes of prolonged jaundice.

Example 1)

An infant with: prolonged neonatal jaundice (or family history of prolonged neonatal jaundice), **Constipation**, **dry** skin, FTT (**Failure to Thrive**), **Protruded tongue**, **flat nose**, **widely set eyes**

→ **Congenital Hypothyroidism**.

Example 2)

4-week-old baby having jaundice since few days after birth. She is healthy and fully breastfed. Her stool is creamy and yellow in colour. What is the likely cause of jaundice among the following options?

A. ABO incompatibility

B. Biliary atresia

C. **Breast Milk Jaundice**.

D. congenital rubella infection

◙ The jaundice that appears after the first 24 hours of life and **persists for > 2 weeks** is called (**Prolonged Jaundice**).

◙ The jaundice in this stem appeared a few days after birth and persisted for around 4 weeks now. So, it is a case of "Prolonged jaundice".

◙ Among the given options, both **B** and **C** are causes of prolonged Jaundice.

◙ Regarding **B** (**Biliary atresia**), there has to be a picture of **obstructive jaundice** (ie, Pale stools, Dark urine) which is not the case here.

◙ So, the likely answer is C (**Breast milk Jaundice**).

Example 3)

A 5-week-old infant is brought to the GP by their parents due to concerns about prolonged jaundice. The baby was born at term via an uncomplicated vaginal delivery and has been thriving, with no issues related to feeding. The infant is fully breastfed. The parents have noticed that the baby's skin and the whites of the eyes have remained yellow for the past few weeks. The baby's stools are described as normal in colour. On examination, the infant is alert, active, and has appropriate weight gain for age. There is no hepatomegaly or other significant findings on physical examination. What is the most appropriate next step?

A) Test for galactosaemia.

B) Measure serum bilirubin levels and liver function tests.

C) Conduct a sweat chloride test.

D) Check for glucose-6-phosphate dehydrogenase (G6PD) deficiency.

E) Continue monitoring without further investigations.

Answer → B) Measure serum bilirubin levels and liver function tests.

For this 5-week-old infant presenting with prolonged jaundice, it is vital to perform tests to measure serum bilirubin (both conjugated and unconjugated) and liver function tests (LFTs) to determine the cause of jaundice.

Although the lack of pale stools makes biliary atresia less likely, it should still be considered. Initiating with these tests helps refine the diagnosis and identify the next steps.

Evaluation Steps

Serum Bilirubin Levels:

- **Total Bilirubin**: Measures the combined levels of unconjugated (indirect) and conjugated (direct) bilirubin.
- **Direct (Conjugated) Bilirubin**: High levels suggest issues with the liver or bile ducts, such as biliary atresia or neonatal hepatitis (due to intrahepatic cholestasis).
- **Indirect (Unconjugated) Bilirubin**: Elevated in conditions like physiological jaundice and breastfeeding jaundice.

Liver Function Tests:

- **Alanine Aminotransferase (ALT) and Aspartate Aminotransferase (AST)**: Raised levels indicate liver cell injury.

	• **Alkaline Phosphatase (ALP)**: High levels are often associated with cholestatic liver diseases.
Key 48	In a child with **UTI** (**positive leucocyte esterase and/or nitrates on urinalysis**) → **Send urine sample for culture and sensitivity**. → **Commence prophylactic antibiotics** while waiting the results. **If still feverish after 2 days of antibiotics**? → **URGENT Ultrasound** **Or** → **Micturating Cystourethrogram (MCUG)** to look for any bladder, ureters anatomical problems or Vesicoureteral reflux (VUR). ***So, if "urgent" Ultrasound is not in the options, pick → MCUG*** **What if the child responds well to Antibiotics**? **Ultrasound (within 6 weeks)** **Be careful!** ◙ **In children with UTI who have been given Antibiotics (Abx)** √ If **no** response to Abx within 2 days → **URGENT US** (not within 6 weeks!) or **MCUG**

	√ If There is **response** to Antibiotics within 2 days → **US** (fine within 6 weeks)
Key 49	**Murmurs in Paediatrics:** ◙ **P**reterm + continuous "**machinery**" murmur → **PDA** ◙ **Cyanotic** baby with **ejection systolic murmur** → **TOF** (Tetralogy of Fallot) "the ejection systolic murmur here is due to pulmonary stenosis which is a feature of the 4 main criteria of TOF". Remember, **TOF** is one of the main causes of "cyanotic" congenital heart disease. ◙ **Progressive** (**Severe**) **Cyanosis** + **Poor feeding** + Holosystolic (**pansystolic**) murmur along the left sternal border → **Tricuspid Atresia**. ◙ **A**cyanotic, Pan-systolic murmur → **VSD** (Others: Poor feeding and poorly gaining weight) --- **Congenital Heart Diseases**

Cyanotic Congenital Heart Disease (R → L)

[5T's with 1-5 mnemonic]

Truncus arteriosus	Vessels join to make **1**
Transposition of great vessels	**2** major vessels switched
Tricuspid atresia	**3** (tricuspid)
Tetralogy of Fallot	**4** defects
Total anomalous pulmonary vascular return	**5** letters (TAPVR)

Acyanotic Congenital Heart Disease (L → R)

Atrial septal defect (ASD)

Ventricular septal defect (VSD)

Patent ductus arteriosus (PDA)

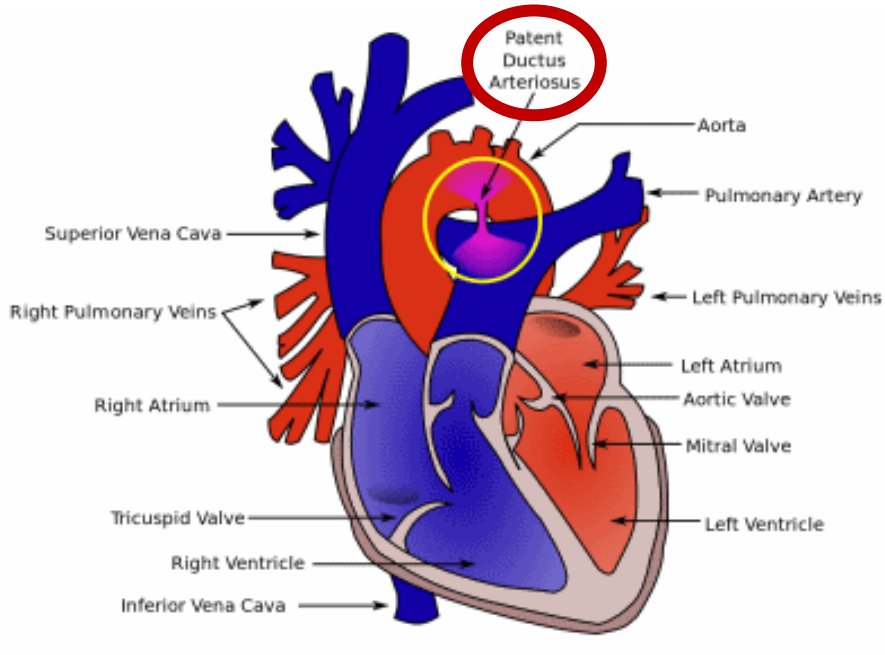
Coarctation of aorta (CoA)

Patent Ductus Arteriosus (PDA)

Overview

- A form of congenital heart defect
- Usually closes in 48 hours after birth in (Term) babies but remains open in (Preterm) babies.
- **'Acyanotic'. (√)**

- Connectio‘‘between ’’e **pulmonary artery** and **descending aorta**
- more common in **premature (Preterm) babies**. **(√)**
- May close spontaneously



Features

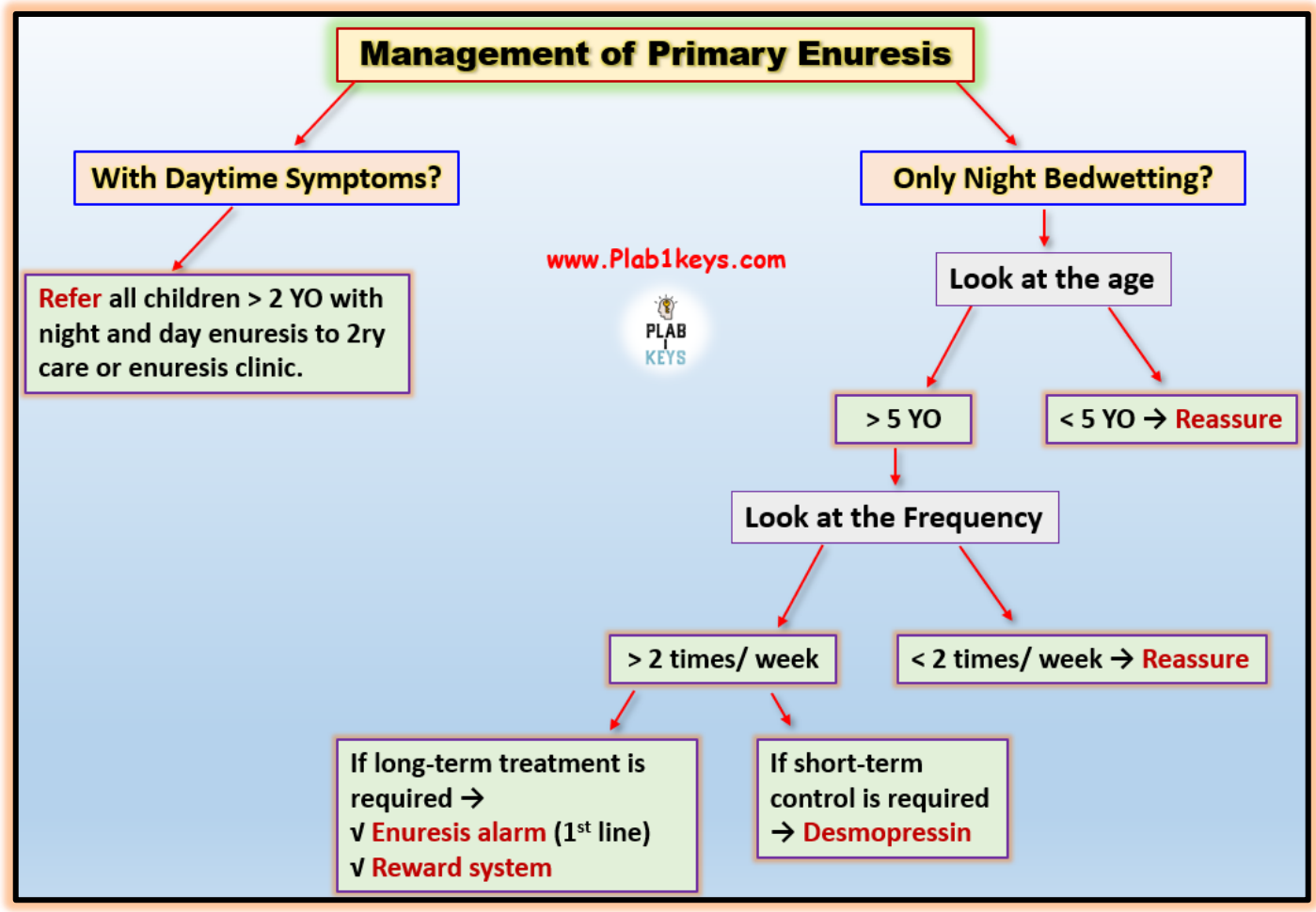
- left subclavicular thrill (sometimes **rough systolic murmur along the left sternal border**)
- **Continuous ‘machinery’ murmur (√) “best heard beneath the left clavicle”**
- large volume, bounding, collapsing pulse
- wide pulse pressure

	Diagnosis → **Echo** ***Management*** • **Indomethacin (a NSAID) (ind=end=closes the duct)** (inhibits prostaglandin synthesis) → closes the connection in the majority of cases. **(√)** • If associated with another congenital heart defect amenable to surgery then **prostaglandin E**1 is useful to keep the duct open until after surgical repair.
Key 50	**Hearing Tests in Children** The answer would always be → **Arrange or refer for hearing assessment (Audiology Test)** in any of the following conditions: • **Any parental concern about hearing loss at any time (*Despite previously normal hearing tests*).** • **Professional (Doctor's) Concern.** • **Temporal bone fracture.** • **Bacterial Meningitis.** • **Severe Unconjugated Hyperbilirubinemia.**

	• **Delayed speech and language milestones.** **Hearing Tests in Children** • **Below 6 Months:** - ***Otoacoustic Emissions*** (OAE), or: - ***Audiological Brainstem Responses*** (ABR) • **6 Months – 18 Months** → ***Distraction Testing*** • **2-4 Years:** - ***Speech Discrimination***, or: - ***Conditioned Response Audiometry*** (CRA) • **5 years** → ***Pure Tone Audiogram*** (PTA)
Key 51	*Careful not to mix things up!* ◙ In cases of **Croup** (*Barking cough, Stridor, Coryza, Steeple sign…*) → **Oral Dexamethasone**. ◙ If **severe Croup** → **O2** + **Nebulised adrenaline**. ◙ **Bronchiolitis** (*Wheezes, SOB, Cough, Coryza, Poor feeding, Fever…*) → **SUPPORTIVE CARE** (including humified O2, NGT feeding if a child not tolerating orally, Suction of excessive secretions) **EVEN IF SEVERE**.

	Some may think as long as <u>Bronchiolitis</u> has become severe (with ↑ SOB and high fever), they should give nebulised epinephrine or nebulised salbutamol. However, NICE recommends against this and suggests <u>supportive care</u>.
Key 52	**IMPORTANT DDx** ◙ Fever + **irritable unwell** child + **red-brown blotchy rash** "often **itchy**" on **face** then spreads to body ± **White centre spots** on the oral cavity (Koplik spots) → **Measles**. ◙ Fever + cough, rhinorrhea (coryza) + conjunctivitis, "Koplik spots are not always mentioned) → **Measles**. "Remember, scarlet fever always has sore throat". ◙ **Mild** Fever, **Rash on the <u>face initially</u>** eg, **behind ear** then spreads to body + **Lymphadenopathy (swollen LNs)** + **Red petechiae in mouth** → **Rubella**. ◙ A sudden **HIGH fever** (>39) in a child followed by **Rash on Chest/Trunk**, body, legs (BUT **<u>NOT</u>** ON HEAD and NECK) → **Roseola** **(Roseola infantum)**

	√ Note that (measles) and (Rubella) tend not to appear in children who are Fully Immunised. ♦ Rx in these cases → **Supportive (paracetamol/ ibuprofen) + Reassurance**
Key 53	**Remember,** Children > 2 YO who have Night bedwetting (+) Daytime symptoms → **Refer to 2ry care or an enuresis clinic**.



Key 54

(♦) **Kawasaki disease** is not an infection; it is Vasculitis. Hence, we treat it using high dose aspirin and IV immunoglobulins for fear of **aneurysms**.

(♦) **Scarlet fever** is bacterial infection (**Strept. Pyogenes**). Thus, we treat it with penicillin V (or Azithromycin if there is penicillin allergy).

(♣) **Kawasaki disease** → Fever that does not respond to antipyretics and lasts for 5 days or more + **4 of:** Conjunctivitis + Painless Cervical LNs +

	Strawberry Tongue/ Red Cracked lips + Red palms and soles with a later desquamation. (♣) **Scarlet fever** → Fever + (SORE THROAT) ± [Sandpaper Rash, No redness of palms or soles, Painful Cervical LNs, Tonsils covered with exudates].
Key 55	**Acute Lymphoblastic Leukemia (ALL)** • **Children.** • **Pancytopenia** √ Low Hb → Anemia → ***Fatigue***, ***Pallor***…etc. √ Low WBCs → ***Recurrent Infections***. √ Lowe Platelets → Thrombocytopenia → ***Bleeding, Bruises*** • Bone Marrow Aspiration/Biopsy → **Numerous Blasts**. ♦ In the exam, ***pancytopenia*** is either **ALL** or **Aplastic Anemia**. BM biopsy can differentiate. √ In the exam, all leukemia that occurs in children is ALL. *You will find the other types of leukemia in the hematology chapter.* *Remember these clinchers:*

Important Leukemia Clinchers: (The Age is Very Important)

ALL	Child (Up to 15 YO), **Pancytopenia**, **Blast cells**.
AML	Adult (20-30 YO), **Auer rods**, **Blast cells**.
CML	Middle age (40-50 YO), **Massive Splenomegaly**, **Philadelphia chromosome**, **Granulocytes** (Neutrophils, basophils, eosinophils) **without blast cell, in all stages of maturation** (i.e. myelocytes, metamyelocytes…)
CLL	Old (> 60 YO), usually no splenomegaly, **smudge cells**, Cervical LNs, **Mature Lymphocytes**.

Key 56

Remember, a child or infant with **Prolonged/ Worsening Respiratory symptoms (e.g. cough/ SOB)** + **Malabsorption** (e.g. Abdominal distention/ Steatorrhea) ± **Delayed development** (e.g. Low weight for age)

→ Consider **Cystic Fibrosis**.

→ **Sweat test**

→ The reason → **High viscosity of mucus secretions**

Cystic fibrosis is an **autosomal recessive** disease (like thalassemia, SCA and congenital adrenal hyperplasia "21-hydroxylase deficiency"). This means that **If** Both **Parents are** Carriers →

- 25% **chance of a child to be** affected**.**

	• 25% **chance of a child to be** Healthy**.** • 50**% chance of a child to be a** Carrier**.** ***Newborn → From delivery – up to 28 days of age.*** ***Infant → 1 month – 1 Year of age.*** ***Toddler → 1-3 YO.*** ***Pre-school → 3-5 YO.*** **Weight at birth can be classified into three categories,** • **Normal (birth weight ≥2.5 kg to < 4.0 kg),** • **Low birth weight (birth weight < 2.5 kg)** • **(Macrosomia) (birth weight ≥ 4.0 kg).**
Key 57	• Please, note that **corticosteroids** are used after **renal transplant** for immunosuppression "to prevent rejection". • **Long-term use of steroids** can lead to **Cushing Syndrome** (high cortisol).

◙ *Example*,

A child who is **obese**, **short**, with **abdominal striae** with **Hx of renal transplant**.

√ The cause of these manifestations → **Cushing Syndrome** (High Cortisol levels) due to exogenous intake of steroids post renal transplant.

√ The child is **short** because steroids are Anti-Vit D. Also, high cortisol leads to high blood glucose which inhibits GH (growth hormone).

√ **Important features of Cushing** in pediatrics →

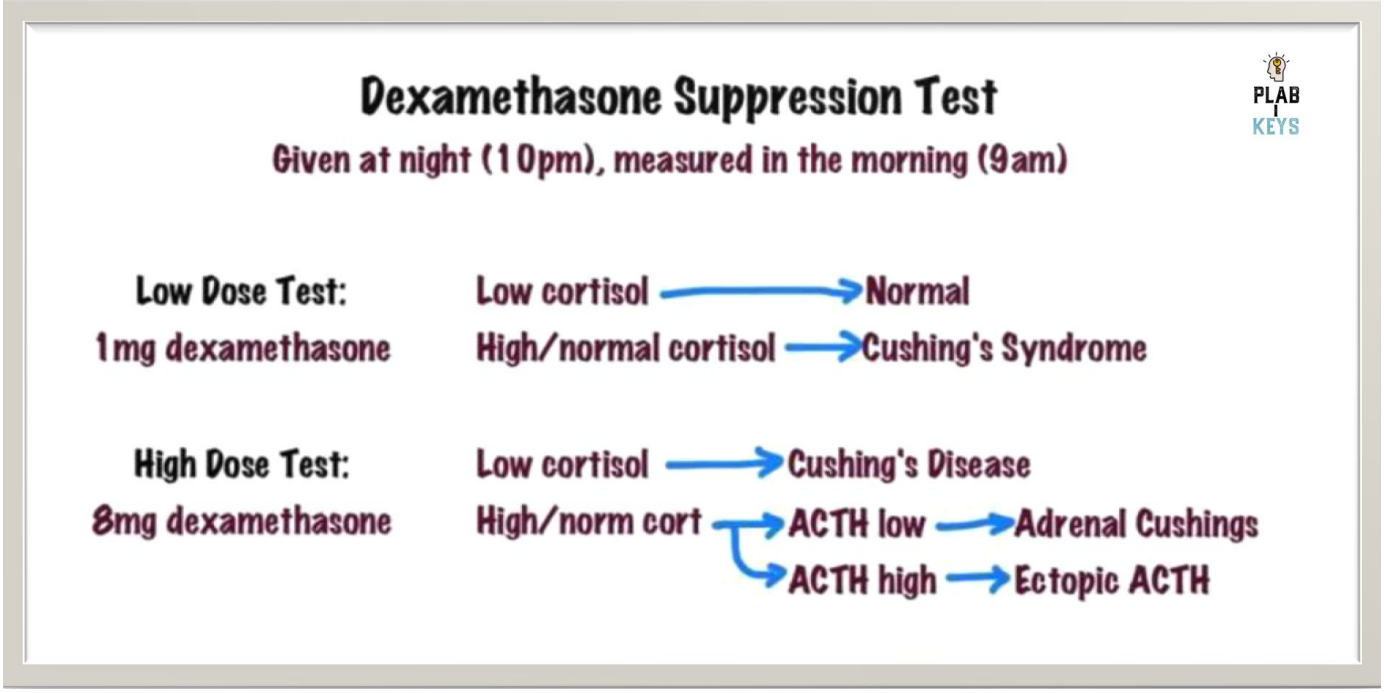
Moon face, **buffalo hump**, **mood/ behavioural changes**,

obesity, **short,** **striae**, **Hyperglycemia**, **Hypokalemia**,

√ **Investigations of Cushing**:

- The outpatient screening test → **24 hours urinary free cortisol**.
- The best **initial** test to establish the Dx

  → 1 mg = (low-dose) = **Overnight Dexamethasone Suppression test**.
- **To localise the lesion** (to differentiate between pituitary adenoma and ectopic source → **High dose dexamethasone suppression test**



◙ If **ACTH is low**, this rules out pituitary and ectopic causes → go for **adrenal CT**.

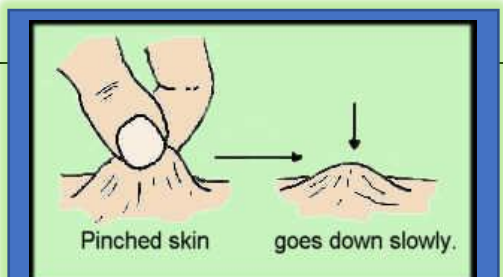
◙ If **ACTH is high**, go for **high dose dexamethasone suppression test**:

√ If suppressed (**low cortisol**), this is Cushing disease → go for **pituitary MRI**.

√ If not suppressed (still **high cortisol**), this is ectopic → **CT chest**, **abdomen**.

Key 58

◙ For any patient presents with **Dehydration**, the first step Rx should be → **Rehydration (Fluid Replacement)**.



◙ Signs of Dehydration:

- **↓ UOP "urine output"** | **↓ Skin turgor.**
- **↑ HR (Tachycardia). ↑ RR (Tachypnea).**
- **Dry Mucous Membranes.** | **Sunken eyes.**

◙ The commonest cause of Dehydration in Paediatrics is **Gastroenteritis** (Diarrhea) due to **Rotavirus**.

◙ Fluid replacement is done either by

√ **Oral Rehydration Solution** (if not severe, and child can tolerate orally).

√ **Admission** + **IV fluid** (If severe/ going into hypovolemic shock -e.g. *hypotension*, *prolonged capillary refill time*, *pale mottled skin*, *cold peripheries*, ↓ *level of consciousness*) or cannot tolerate orally.

◙ (**Important**), for **IV Fluids** in Dehydrated children who cannot tolerate orally:

√ Initial **Boluses** → **Normal Saline (0.9%) NaCl**.

√ For **Maintenance** → **0.9% NaCl + 5% Dextrose**. √

◙ (**Important**), if there is associated hypokalemia (↓ K+) with severe dehydration.

	→ Give **IV 0.9% NaCl along with KCl "Potassium Chloride"** to correct the hypovolemia as well as the low potassium.
Key 59	**Osteogenesis Imperfecta** **(Type 1- Autosomal dominant – collagen metabolism disorder → Brittle Bone Disease)** √ **Presentation** *Children ▌Multiple/ Unexplained fractures ▌Blue Sclera ▌Dental abnormalities ▌Brittle bones ▌Hearing loss 2ry to Otosclerosis* √ **Rx** → Give **Bisphosphonate**
Key 60	**DiGeorge Syndrome** Mnemonic → **CATCH 22** √ **C**left Palate. √ **A**bnormal Face. √ **T**hymic Aplasia (**Absent thymic shadow on the X-ray**). √ √ **C**ardiac → TOF. √ **H**ypocalcemia/ Hypoparathyroidism.

	√ **22** → the chromosomal abnormality is on the chromosome 22. ◘ ***The most important thing to remember is that:*** **Absent Thymic shadow** → **DiGeorge Syndrome**
Key 61	**Regarding Febrile seizures:** **√ 1/3** of cases with a Febrile convulsion → will have **further episodes** of febrile convulsion (if they develop fever **before** the age of **6 years**). *"Remember, febrile convulsions are commonest between 6 months – 6 years old)* **√ 1/3 of the cases who had Further episodes** of Febrile seizure → will develop **Epilepsy**. **√ (≈ 10% of all complex febrile convulsion cases would develop epilepsy**).
Key 62	"**Remember** that **repetitive projectile non-bilious vomiting especially after feeding** in **pyloric stenosis** can cause **hypochloraemic hypokalemic alkalosis (low Cl-, Low K+)** which prompts urgent correction.

	♠ Therefore, if the question asks about the **next step** or **the most URGENT step**, the answer would be → (**measure serum K+**), ♠ whereas if the question asks about an investigation for **Diagnosis**, the answer will be → "**Abdominal Ultrasound**".
Key 63	**Painless rectal bleeding in a 2-3 YO Male child** → **Meckel's Diverticulum**.
Key 64	**This Key is VERY IMPORTANT.** **√ Here are the most important and commonly asked Syndromes in Paediatric.** **√ Note that the Genetic Chapter has these Syndromes in more details.** **√ Nonetheless, for paediatrics, these are more than enough.** ◙ *Hyperelasticity of skin* + *Hypermobility of joints* ± *Blue Sclera/ Bruises* → EDS "**Ehlers-Danlos Syndrome**" (Collagen Problems). (Risk of Subarachnoid Hemorrhage)

◙ Important Features of Turner's Syndrome:

Short stature | Short Webbed neck | Widely spaced Nipples | OVARIAN FAILURE (1ry Amenorrhea) | Impaired Pubertal Growth | Bicuspid Aortic Valve

Important:

Turner

Prader Willi Syndrome

• Genetic/ congenital disease →

deletion of some genes of the **paternal chromosome #15.**

♦ During **Neonatal** period → **Hypotonia** (**Floppy baby**) / Difficult to feed (thin upper lip and downturned mouth) / short extremities / **almond-shaped eyes**.

♦ During **Childhood** → **Excessive eating** (**hyperphagia**) / **Obese** and **Short** / **learning difficulties** / growth abnormalities / self-injurious behaviour.

♠ *Brother Willi is like an octopus; he is **Floppy** and **likes to eat!***

Duchenne Muscular Dystrophy (DMD)

√ 4-8 YO ♂ (boy) who started to walk late (≥ 18 months instead of 12 months)

√ Gower's sign → the boy uses his hands to push on his legs to stand.

√ Proximal Muscle weakness.

√ Waddling gait (he cannot run).

√ (↑) CK "Creatine Kinase", ALT, AST.

√ X-linked Recessive (affects MALES)

◙ **Diagnosis:**

→ Initial test → **CK** "Creatine Kinase"

→ **Muscle Biopsy**

→ **Genetic Testing** (Obligatory after +ve striated muscle biopsy).

DMD has a mutation defect in Dystrophin protein which lies in **Striated muscles**.

Remember

◙ Autosomal **Recessive** Conditions: (25% if **both parents** are **carriers**)

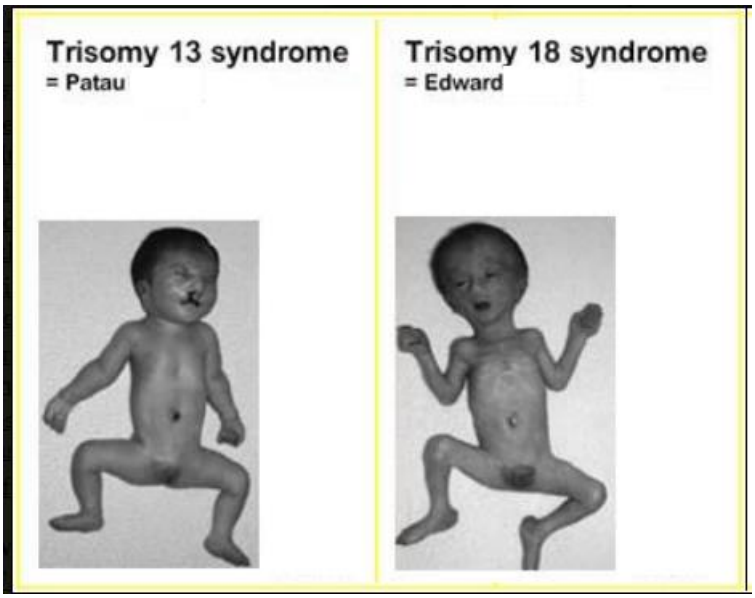
Cystic fibrosis ▌Thalassemia ▌Sickle Cell Anemia ▌Congenital Adrenal Hyperplasia (e.g. 21-Hydroxylase Deficiency)

◙ Autosomal **Dominant** Conditions: (50% if **One parent** is **affected**)

ADPKD ▌**Huntington** ▌**Neurofibromatosis**

◙ X-linked **Recessive** Conditions: (**Male**: 50% if **mother** is **carrier**)

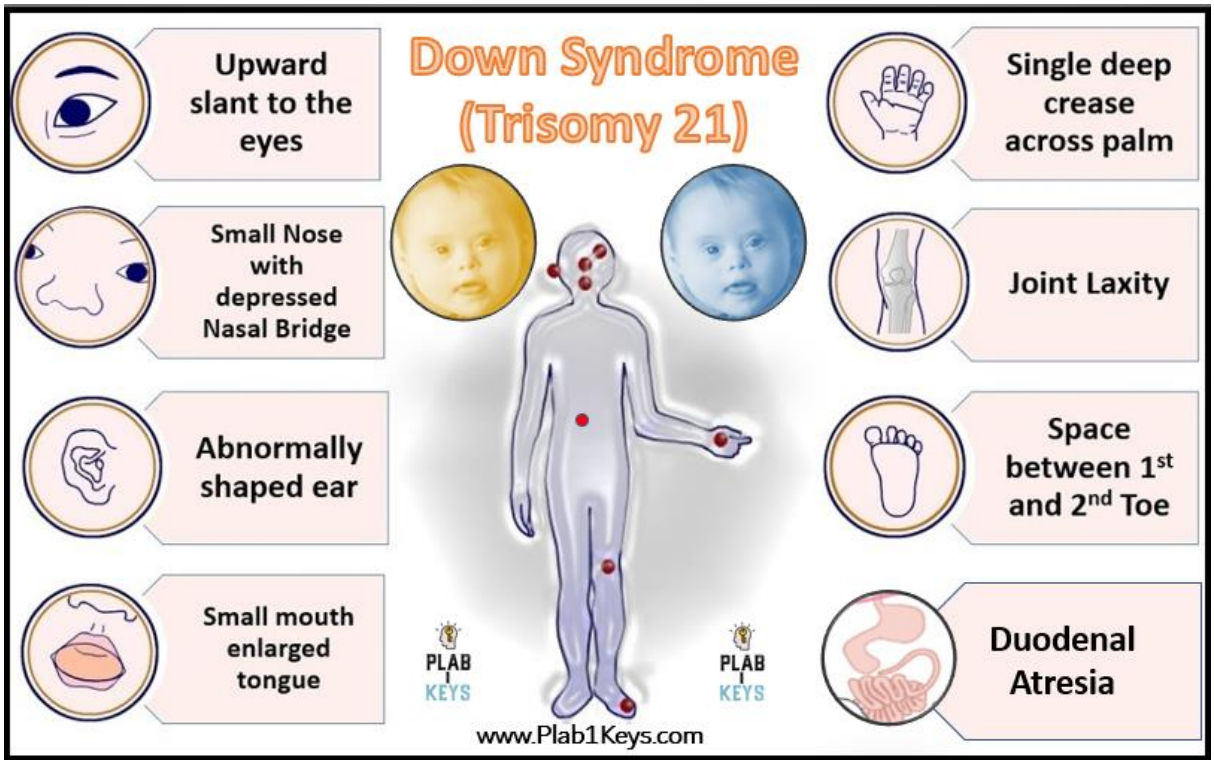
DMD ▌**Haemophilia**



Trisomy 13 (Patau Syndrome)	Trisomy 18 (Edward Syndrome)
Prominent Calcaneus (rocker bottom feet).	Prominent Calcaneus (rocker bottom feet).

Cleft lip and palate.	Prominent Occiput
Microcephaly (Small Head)	Microcephaly (Small Head).
Microphthalmia (Small Eyes)	Micrognathia (Small Jaw).
Polydactyly (Multiple Fingers)	Hands are clenched into fists with Overriding Fingers.

Trisomy 21 (Down Syndrome)



◙ Remember, an important hint in **Down Syndrome** that might be given is the **double bubble sign** (**Duodenal Atresia**) besides the morphological features.

◙ Also, **Atrioventricular septal defect** (AVSD) is the most common congenital heart defect in people with down syndrome.

Look for: systolic murmur, single palmar crease, short broad hands, flat nasal bridge and epicanthic fold.

Example,

A neonate's chest x-ray shows "Double Bubble Sign". He has flat occiput and low set of ears.

The likely Dx → **Down Syndrome**.

Note: **Double bubble sign** → **Duodenal Atresia**.

♠ *Brother "Prader" Willi is like an octopus; he is Floppy and likes to eat so much!*

♠ *Edward has 2 prominents and 2 smalls:*

√ *The 2 prominents are the highest (Occiput) and the Lowest (Calcaneus).*

√ The 2 smalls are small **head** and small **jaw**. 2X2= 4 (X2) = 8 → Trisomy 18.

♠ **Patau** → cleft lip and palate, 2 smalls: head and eyes. Many fingers (13) → Trisomy 13.

♦ Many fingers in **Patau** (13), fingers override each other in **Edward**.

Congenital Adrenal Hyperplasia

◙ **Autosomal Recessive** (Like ***Cystic Fibrosis***, ***Thalassemia***, ***Sickle Cell Anemia***)

→ If both parents are carriers → **25%** (**1:4**) chance their child will be affected.

◙ Cortisol Deficiency ± Aldosterone Deficiency ± **Androgen Excess**.

(BILATERALLY ENLARGED ADRENAL GLANDS)

→ **Salt-Wasting (Hyperkalemia + Hyponatremia)**

◙ The most common form → **21-Hydroxylase Deficiency**

◙ Classic Presentation:

- **Female** → Ambiguous genitalia.
- **Male** → Penile Enlargement, Hyperpigmentation
- **Infant Male** → **Salt Wasting** (due to **Aldosterone Deficiency**)

→ Vomiting, Weight Loss, Lethargy, Dehydration, ↓Na+, ↑K+

→ (**11-ß-Hydroxylase Deficiency**).

Absent Thymic shadow → **DiGeorge Syndrome**

Tall, Thin boy, (Spontaneous Pneumothorax), long extremities, scoliosis, flexible joints, Myopia

→ **Marfan's Syndrome**

(spontaneous pneumothorax is common in Marfan's Syndrome)

Do not mix things up with **Klinefelter's Syndrome** as it appears in Adulthood.

	(**G- FELTER**) • *Gynecomastia* ▌• *Facial hair: low* ▌• *Estrogen is High but testosterone is low* ▌ • *Long limbs* ▌• *Tall, slim* ▌• *Elevated FSH, LH* ▌• *Rage "Aggressive Behaviour"* √ Low testosterone, High estrogen, FSH, LH. √ **Hypogonadism** → **Small testes** → **Azoospermia** (no sperms in semen) → male **infertility**. √ Best Diagnosed by → **Karyotyping** = (**Chromosomal Analysis**) (47 XXY).
Key 65	**Constitutional Delay in Growth and Puberty**. ◙ Some children have delayed puberty, short stature (skeletal and height growth -Temporarily- ceases). They cease in growth at 10-12 YO then may start gaining length again to catch their peers at 17 YO. ◙ If there is a known constitutional cause (eg, a family history of short stature) → **Reassess growth in 6 months**. ◙ If there is no known cause for short stature? → **X-ray wrist for bone age assessment**.

	This is done to obtain the **age of the bone**; how much time has left before fusion of the gaps between bones and stopping of growth, is there an indication to give GH? The next step would accordingly be made but it is mostly → Reassurance.
Key 66	3 YO child – not immunised – high fever of 2 days – erythematous maculopapular rash on face – rash on buccal mucosa as well → **Measles** (rash on buccal mucosa → Koplik Spots) --- **Note, Rubella presents similar to Measles but with** √ **Enlarged LNs**. √ **Froschheimer's Spots on "soft palate"** not "buccal mucosa". --- **Sudden HIGH Temperature followed by non-itchy rash on CHEST or legs then spreads to body. (but not on head and neck):** → **Roseola (Roseola infantum)**

Key 67

Remember,

Management of 2ry Enuresis.

The child was dry for at least 6 months and then started wetting himself at night ± at daytime

→ **Refer to paediatrician**

√ Common causes of 2ry enuresis → **Emotional upset** (could be a result of child abuse), UTI, DM (polyuria), constipation. Therefore, a paediatrician will investigate possible causes.

Key 68

Wilson's Disease.

♦ Autosomal Recessive.

♦ **Copper deposition in Liver**.

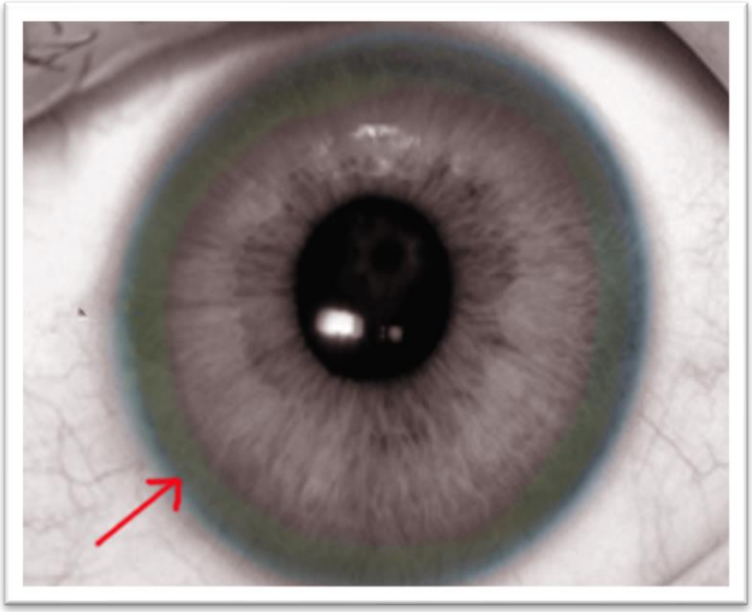
♦ Presentation

√ **Liver problems** → Hepatosplenomegaly, Deranged Liver function, Cirrhosis.

√ **CNS** → Ataxia, Asymmetrical tremor, Dysarthria, Dystonia (Clincher √).

√ **Behavioural** → Decrease school performance, Personality changes (√)

√ **Kayser–Fleischer rings** (KF rings) are dark rings that appear to encircle the cornea of the eye. They are due to **copper** deposition in the Descemet's membrane seen in Wilson's disease. (important √).



Greenish-gold ring on cornea (due to **copper deposition**)

This is called **Kayser-Fleisher ring**, seen in **Wilson's disease**.

♦ Dx of Wilson's disease:

√ Initially → LFT (+) Serum Ceruloplasmin (very low < 0.1)

♦ Rx of Wilson's disease:

√ Lifelong penicillamine.

√ If Acute Liver Failure → Liver Transplant.

Hereditary Haemochromatosis.

	♦ Autosomal Recessive. ♦ ↑ Intestinal Absorption of Iron → **Iron Accumulation "Deposition"** in Tissues, such as: · **Liver** "The main organ of iron deposition" → **Hepatomegaly**, **Cirrhosis** → HCC = **Hepatoma** "Hepatic Cancer" . · **Pancreas** → **Diabetes Mellitus**. · **Skin** → **Bronze Skin** (**Hyperpigmentation**). · **Joints** → **Arthropathy**. · **Heart** → Arrhythmia, **Cardiomyopathy** → **SOB**. ♠ Remember in Haemochromatosis, the triad: **Hepatomegaly** + **DM** + **Bronze Skin ± Arthropathy.** ♠ Remember that the "**Liver**" is the most likely organ to get **cancer** in Haemochromatosis (Due to Cirrhosis and iron deposition). ♠ Remember that **Wilson's** has ***CNS*** and ***Behavioural issues***! (clincher √)
Key 69	◙ A **5-10% reduction** in a baby's **weight** in the **first few days** of life is **NORMAL**. → **Reassure**. ***Example,***

	A baby was born with a weight of 3.5 kg 8 days ago. Now, his weigh is 3.3 kg. → **Reassure and tell mother to continue regular child care**.
Key 70	A baby, who was born yesterday evening, develops jaundice. What should you tell his mother who has called you to inquire? → **Advice to return to the hospital to be seen within 2 hours**. ♦ This is not a Physiological jaundice. Remember, Physiological jaundice usually develop after 24 hours has passed since delivery. ♦ This child was born yesterday evening, meaning that the jaundice has appeared within **the first 24 hours of life**. The first day of life jaundice is always **pathological**! ♦ A return to a hospital should be made so further assessment can be done in 2 hours "as advised by NICE". **◙ Causes of jaundice in the first 24 hrs** **√** Rhesus haemolytic disease (Rh incompatibility) **√** ABO haemolytic disease (ABO incompatibility) **√** Hereditary spherocytosis **√** Glucose-6-phosphodehydrogenase (G6PD) deficiency.

Key 71	**Remember**, In a patient with **indigestion/ malabsorption** and **Jejunal biopsy** reveals **Macrophages with PAS** **Periodic Acid-Schiff Granules** → **Whipple's disease**. A baby with **abdominal distension**, **diarrhea, bloating**, **microcytic hypochromic anemia**, **+ve alpha gliadin Abs** → **Celiac disease** **√ Other Investigations in Celiac disease:** +ve **Tissue transglutaminase Abs** (first line) ▌+ve **anti-endomysial Abs**.
Key 72	**Chronic cough** + **Jaundice** in a child Think → **Alpha-antitrypsin deficiency** (Respiratory + Liver problems).
Key 73	**Nephrotic Syndrome** ◙ **Triad of:** 1. **Proteinuria** 2. **Hypoalbuminaemia** 3. **Oedema**

◙ In **children**, the peak incidence is **between 2 and 5 years** of age.

◙ Around 80% of cases in children are due to **Minimal change glomerulonephritis**.

◙ **Minimal change disease** nearly always presents as **nephrotic syndrome**, accounting for 75% of cases in children and 25% in adults.

◙ The condition generally carries a **good prognosis** with around 90% of cases responding to **high-dose oral steroids**.

◙ Other features include:

√ **hyperlipidaemia**,

√ **hypercoagulable state** (due to loss of antithrombin III) **√**

√ **predisposition to infection** (due to loss of immunoglobulins).

◙ **Features of minimal Change glomerulonephritis**:

√ **Nephrotic syndrome**.

√ **Normotension** – hypertension is rare.

√ **Selective proteinuria** (only intermediate-sized proteins such as ***albumin*** and ***transferrin*** leak through the glomerulus).

√ **Renal biopsy** (Definitive Test)

→ **electron microscopy shows fusion of podocytes.**

	Example A 5 YO child presents with ↑ weight, Puffy eyes, Lower limb swelling. He is otherwise healthy and happy. **What do you expect to see on Urine dipstick**? → **Presence of protein**. ***Note, more examples on Nephrotic Syndrome exist in the Nephrology Chapter.***
Key 74	**Be careful!** √ The most likely outcome of a fully treated Meningitis is → **Complete recovery**. **However**, "*One of the delayed complications of bacterial **meningitis** is **hearing loss***". √ So, after treating meningitis → Arrange **Hearing Test**! ***(Any of these 2 points can be a question, so be careful with the question wording).***
Key 75	**IMPORTANT clinchers from the Haematology Chapter**

- **↑ PTT** alone + (Bleeding into muscles or joints or easily bleeding)

→ think of **haemophilia**.

- **↑ PTT** and **↑ Bleeding Time** + (Mucosal Bleeding e.g. epistaxis)

→ think of **VWD** "Von Willebrand Disease".

- **↑ PTT** and **↑ PT** and **↑ Bleeding Time** +

(Bleeding at any site e.g. purpura, petechia, GIT, ENT, venepuncture site)

→ think of **DIC**.

- Only **↓ Platelets** + Bleeding/ Purpura ± **Hx of URTI** →

ITP "*Idiopathic Thrombocytopenic Purpura*)

Normal PT: 10-14 sec.

Normal PTT: 35-45 sec.

Bleeding Time: 3-9 minutes.

Hemophilia A	**Hemophilia B** **= "Christmas Disease"**

	More common (90% of the cases)	Less common
	Factor **VIII** (8) deficiency.	Factor **IX** (9) deficiency.
	Rx: √ **Desmopressin** (it increases Factor 8) √ Major bleeding → Recombinant factor VIII.	Rx: √ Desmopressin has **no** role. √ **Recombinant factor IX** (of choice).
	Important: DO NOT give NSAIDs or IM injections in hemophilia (↑ bleeding)	

Key 76

Note that the presence of FEVER at the due time of a vaccine in a child requires us to delay the vaccine until the child is well!

Notes

√ The presence of **fever** contraindicates receiving a vaccine.

Thus, **defer vaccine until the child is well**.

√ A mild illness and/ or Egg allergy are **not** contraindications to receiving vaccines.

A walk to Remember.

◙ **HIV positive** patients should **NOT** be given the following vaccines:

√ **BCG "TB" vaccine**. (X)

√ **Yellow Fever Vaccine**. (X)

◙ If **CD4 < 200** cells/ ml → Also **AVOID MMR Vaccines**. (X)

A walk to Remember.

◙ It is recommended in the UK that pregnant women receive

IP Vaccines → **Influenza** + **Pertussis** "Whooping cough"

(***Cough*** *and* ***Sneeze*** *vaccine =* ***Whooping cough*** *(****pertussis****) and* ***Influenza***)

√ Note, Pertussis vaccine is not available alone, it comes as a part of the DPT vaccine (Diphtheria, Tetanus, Pertussis).

√ So, pregnant women in the UK are advised to receive **Influenza** and **DPT** vaccines (between **20-32 weeks** of gestation).

Key 77

Traffic light system for identifying risk of serious illness

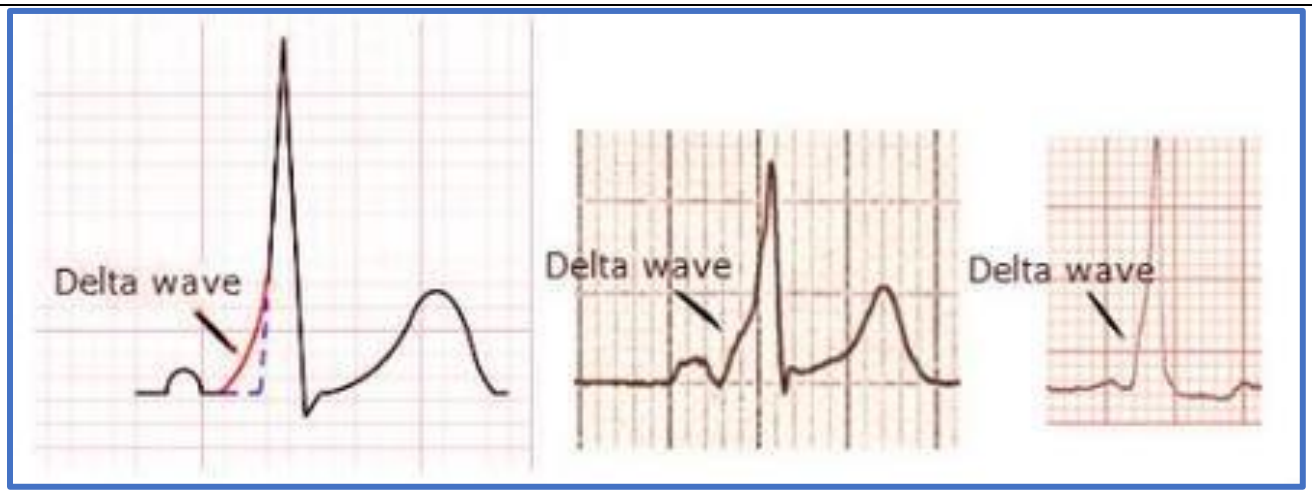
Green – low	Amber – intermediate risk	Red – high risk

You need to know at least the (Red- High Risk) Features in the Traffic Light System.

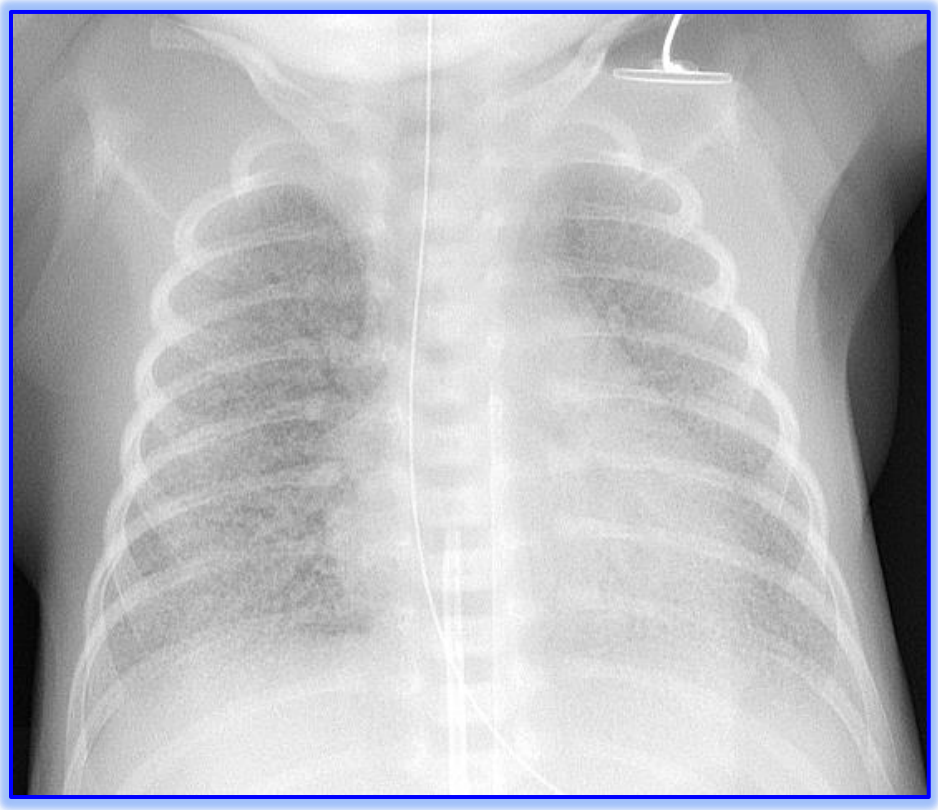
The presence of Fever in a child with one of the following features means he is a high-risk patient.

	The presence of any of the following (RED) features should raise a high concern: ◦ Respiratory Rate **> 60** breaths per minute. ◦ **Pale/ Mottled/ Blue/ Ashen** Skin. ◦ **No** Response to social cues (NO Response **at All**! Not only reduced response)! ◦ The child appears "**ill**" to a **healthcare professional**. ◦ **Does not wake**, or, if awaken "roused" → **cannot stay awake**. ◦ The Cry is either → **Weak** ▌OR **High** pitched ▌OR **Continuous**. (any is a red flag). ◦ **GRUNTING** (careful! Grunting is different from Nasal Flaring. Flaring is Yellow flag – intermediate risk while Grunting is RED – High risk). ◦ **Moderate** or **Severe Chest Indrawing**. ◦ **Reduced Skin Turgor**. ◦ **NON-BLANCHING RASH**. ◦ **Bulging Fontanelle**. ◦ **Neck Stiffness**. ◦ **Age of < 3 months** with a **fever of ≥ 38** C. ◦ **Status Epilepticus**. ◦ **Focal Seizure**. ◦ **Focal Neurological Signs**. A question may present with several features ranging from green to red traffic signs and then asks you which one is the most concerning (the red – the high risk one). Thus, be prepared by knowing these Red – High Risk Features.
Key 78	**Congenital Hypothyroidism** → **Jaundice**,

	Constipation, **Cold mottled dry skin**, **Hypoactive**, **Floppy muscles**, FTT (**Failure to Thrive**), **Protruded tongue**, **flat nose**, **widely set eyes** → Give Oral **Levothyroxine** until 2 years of age. (↑ TSH, ↓ T4) "the normal range in children is different from that in adults. It will be given in the exam".
Key 79	**11 YO girl presents with a sudden onset of palpitations, pallor, SOB while running that resolved in 30 minutes. Cardiac and Chest examinations are unremarkable.** **ECG shows Delta-waves and Wide QRS.** The likely Dx → **WPWS (Wolff -Parkinson-White-Syndrome)**

	
Key 80	**Be careful!** ◙ **In children with UTI who have been given Antibiotics (Abx)** **∨** If **no** response to Abx within 2 days → **URGENT US** (not within 6 weeks!) or **MCUG** **∨** If there is **response** to Antibiotics within 2 days → **US** (fine within 6 weeks)
Key 81	**Note**, **∨** Normal Capillary Refill Time is < 2 seconds. **∨** In a dehydrated child with **↑ capillary refill time** → a sign of clinical shock! → indication for **(IV) fluid rehydration** (Not Oral).

Key 82	◙ In a suspected case of neonatal **Respiratory Distress Syndrome (RDS)** Request → **Chest X-Ray √√√** √ (**A newborn with SOB, Grunting, Tachypnea, Intercostal retractions, Nasal flaring, Cyanosis, Low O2 Saturation**) Common in **Preterm** especially before 32 weeks (due to insufficient lung surfactants → Collapsed alveoli) Initially, SpO2 and Blood gases then immediate Chest X-Ray!! Note, the absence of fever does not exclude Sepsis in neonates. However, in a neonate with respiratory distress, the first investigation should be Chest-X ray. After that, we can send samples for cultures and further investigate. • X-ray in respiratory distress syndrome → **Bilateral ground-glass appearance**. • Note that if preterm delivery is anticipated, the mother should receive **IM Corticosteroids** in order to stimulate lung surfactant production in a baby. • Bear in mind that congenital Pneumonia (consolidation) will remain as one of the DDx and thus the baby will continue receiving antibiotics until pneumonia is excluded.



Neonatal **RDS** "Respiratory Distress Syndrome" Chest X-Ray:

√ Bilateral Diffuse Granular (Ground-Glass) Appearance "due to Atelectasis".

√ ↓ Lung Volume.

Meconium aspiration syndrome

√ Meconium aspiration syndrome refers to respiratory distress in the newborn as a result of meconium in the trachea.

√ It occurs in the immediate neonatal period.

	√ It is more common in **post-term deliveries**, with a rate of up to 44% reported in babies born **after 42 weeks**. (*Remember, **RDS** is common in **Preterm <32 W***). √ It causes respiratory distress, which can be severe. √ Higher rates occur where there is a history of maternal hypertension, pre-eclampsia, chorioamnionitis, smoking or substance abuse.
Key 83	**Remember**, ◙ **In Vesico-Ureteral Reflux** → **Prophylaxis Antibiotics is the first Line** ***This is to prevent recurrent UTIs and thus to prevent kidney scarring.*** (Surgery is not done unless if progressive kidney scarring is noted, which indicates a high grade VUR). ♦ **Dx** √ Initial → Renal Ultrasound (+) Urinalysis, urine culture and sensitivity. √ Gold standard → Micturating Cystourethrogram (MCUG). √ For parenchymal damage (cortical scars) → Technetium Scan (DMSA).

	♦ **Rx** √ Initially → Low-dose antibiotics prophylaxis (e.g. trimethoprim) daily. √ Failed? Or Parenchymal damage? → Surgery (Ureters Re-implantation).
Key 84	♣) **Kawasaki disease** → **Fever** that does not respond to antipyretics and lasts **for ≥ 5 days** + **4 of:** Conjunctivitis + Painless Cervical LNs + Strawberry Tongue/ Red Cracked lips + Red palms and soles with a later desquamation. (♣) **Scarlet fever** → Fever + (**SORE THROAT**) ± [Sandpaper Rash, No redness of palms or soles, Painful Cervical LNs, **Tonsils covered with Pale exudates**].
Key 85	**Congenital Adrenal Hyperplasia** ◙ **Autosomal Recessive** (Like ***Cystic Fibrosis***, ***Thalassemia***, ***Sickle Cell Anemia***) → If **both** parents are **carriers** → **25%** (**1:4**) chance their child will be affected. ◙ **Ultrasound Abdomen** → (**BILATERALLY ENLARGED ADRENAL GLANDS**) → **Salt-Wasting (Hyperkalemia + Hyponatremia) = ↑ K+, ↓ Na+** ◙ The most common form → **21-Hydroxylase Deficiency**

	◙ **Classic Presentation:** • **Female** → Ambiguous genitalia. • **Male** → Penile Enlargement, Hyperpigmentation • **Infant Male** → **Salt Wasting** (due to **Aldosterone Deficiency**) √ → **Vomiting**, **Weight Loss**, **Lethargy**, **Dehydration**, **↑K+**, **↓Na+** **"Important"** → (**11-ß-Hydroxylase Deficiency**).
Key 86	• Only **↓ Platelets** + Bleeding/ Purpura ± Hx of URTI → ITP "**Idiopathic Thrombocytopenic Purpura**) Rx → **IV immunoglobulins and admit to ward**.
Key 87	If you suspect a facial injury (e.g., a child fell on his head and presents with subconjunctival hemorrhage + a cheek swelling and tenderness + Vitals are stable + No Loss of consciousness) ♦ The "**initial**" modality → **Facial X-ray** (especially if you are **FY2 doctor**). ♦ The **confirmatory** "the **best**" modality → **CT Scan Head**.
Key 88	Bloody Diarrhea (followed by) Renal impairment e.g., Hematuria/ Proteinuria/ high creatinine ± Schistocytes on blood smear, ↓ Platelets → HUS (Hemolytic Uremic Syndrome). → E. Coli. (Most common cause of bloody diarrhea in children/ Schistocytes).

Hemolytic Uremic Syndrome (HUS)

Triad:

Hemolytic Anemia

Uremia (Acute Renal Failure)

Thrombocytopenia (Low Platelets)

♦ ***Children √ (e.g. after a trip where they have eaten E. coli contaminated food)***

Eating Undercooked Contaminated food → E. Coli O157 → Produce Verotoxin → Profuse Diarrhea → turns to Bloody Diarrhea → (after 2-14 days) → Uremia "Acute Kidney Injury" (Hematuria, Proteinuria, ↑ Urea and Creatinine).

So, remember:

• **Diarrhea** → turns **Bloody** → **Renal Failure** (**Hematuria**, **proteinuria**…etc).

± **Features of Anemia** (e.g. Pallor, Fatigue) **± Low Platelets**

HUS is the commonest cause of acute kidney injury in children.

Rx → Supportive

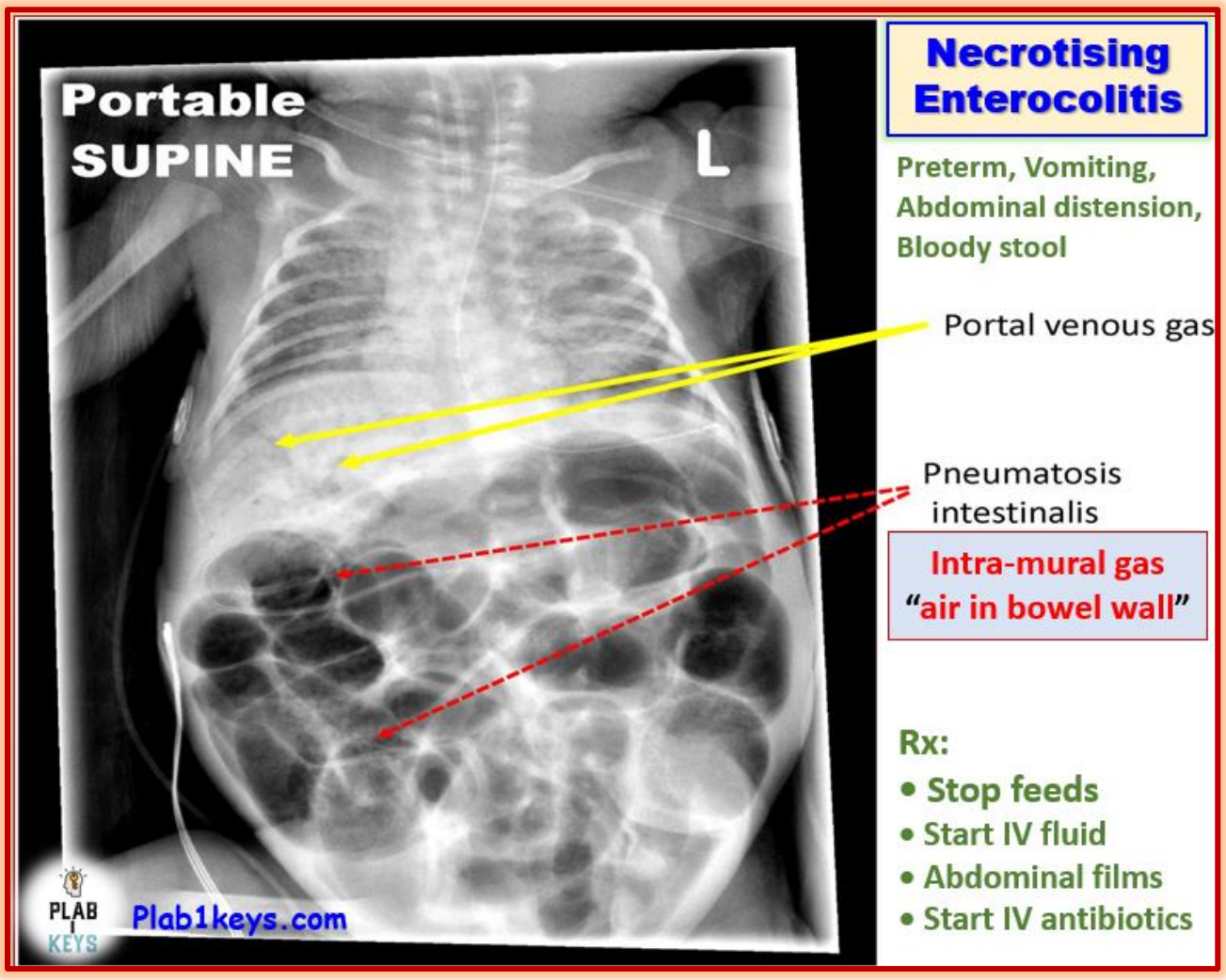
√ **IV fluids** √ ± **Blood Transfusion** √ ± **Dialysis** (if required)

√ If Very Severe → Plasma Exchange

	◙ **Never Give Antibiotics in HUS**! (More toxins are released as the E. Coli dies)
Key 89	Remember, a child or infant with **Prolonged/ Worsening Respiratory symptoms (e.g. cough/ SOB)** + **Malabsorption** (e.g. Abdominal distention/ Steatorrhea) ± **Delayed development** (e.g. Low weight for age) → Consider **Cystic Fibrosis**. → **Sweat test** → The reason → **High viscosity of mucus secretions** **Cystic fibrosis** is an **autosomal recessive** disease (like thalassemia, SCA and congenital adrenal hyperplasia "21-hydroxylase deficiency"). This means that **If** Both **Parents are** Carriers **→** • 25% **chance of a child to be** affected**.** • 25% **chance of a child to be** Healthy**.** • 50**% chance of a child to be a** Carrier**.** ***Newborn → From delivery – up to 28 days of age.*** ***Infant → 1 month – 1 Year of age.***

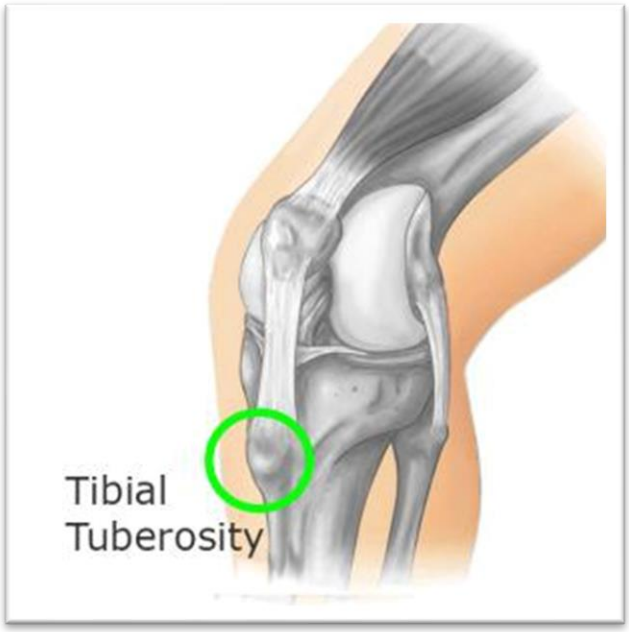
	Toddler → 1-3 YO. ***Pre-school → 3-5 YO.*** **Weight at birth can be classified into three categories,** • **Normal (birth weight ≥2.5 kg to < 4.0 kg),** • **Low birth weight (birth weight < 2.5 kg)** • **(Macrosomia) (birth weight ≥ 4.0 kg).** TTP : Fever, headache , hemolytic anemia, thrombocytopenia HUS: hemolytic anemia, diarrhea, renal failure ITP: Hx of URTI with low platelet only HSP : Hx of URTi , abdominal pain , joints pain , hematuria, rash
Key 90	**Important**! The presentation of **Cystic Fibrosis in a Neonate** is a bit different from that in an older child. In infants, these are some features of Cystic Fibrosis:

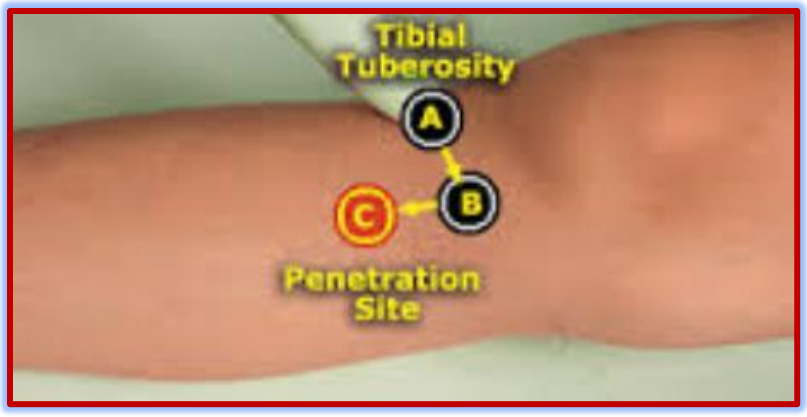
	√ **Pre-natal Ultrasound** → **Echogenic Bowel**. √ **Meconium ileus**. √ **Bilious Vomiting**. √ **FTT**, **Poor Weight Gaining**.
Key 91	**Necrotising Enterocolitis (NEC)** √ **Prematurity** is the main risk factor. √ **Features** **Vomiting = Feeding Intolerance**, **Hypoactivity**, **Abdominal distension**, **Bloody stools**. √ **X-Rays** → (**Distended loops + Air in the bowel wall**) = pneumatosis intestinalis (intramural gas) ***√ Increased risk when empirical antibiotics are given to infants beyond 5 days.*** √ **Treatment** → total gut rest and TPN (total parenteral nutrition), babies with perforations will require laparotomy. → **Stop feeds + start IV fluid + Perform abdominal films + start systemic antibiotics**

	∨ If X-ray shows **pneumoperitoneum** (**air in the peritoneum**), this means there is **perforation**. Therefore → Surgery "Emergent **Laparotomy**" is needed. 
Key 92	**If IV line is urgently required but is not obtainable (the doctors have failed to insert a peripheral IV line), what is the next most appropriate method to deliver fluids or drugs if needed?** → **Intraosseous access**.

(At the proximal tibia, 2.5 cm below tibial tuberosity)

(Avoid the epiphyseal growth plate).





Key 93

Remember,

In Primary Enuresis,

- **If short-term control of bedwetting is required** (**eg,** the child is going to sleep at a camp for 2 days) or > 7 YO

Give → **Oral Desmopressin** (temporary control).

Example,

A 6 YO child with primary enuresis (night bedwetting) without daytime symptoms is going to attend a sleepover party at a friend's house. His mother wants something to help him control his enuresis during this sleepover.

→ **Desmopressin**. (ADH like action).

Key 94

Oesophageal atresia	• **Early recognised before or soon after birth as any attempt at feeding could cause aspiration pneumonia.** • Associated with **tracheo-oesophageal fistula** and **polyhydramnios.** • May present with choking and **Cyanotic spells** following aspiration. • **VACTERL** associations (Vertebral, Anal, Cardiac, Trachea-Esophogeal, Renal/kidney, and Limb defects).

	GORD **in pediatrics**	• **< 1 YO** • **Non-projectile vomiting after feeds**, • Gags, Chocks after feeds, • **Irritable**, **Crying**, **Difficult to feed**, • **FTT (not always, unless if severe GORD).** • Rx → Assess breastfeeding, ↑ frequency and ↓ amount. • **Gaviscon** is first tried, then: • PPI or H2 blockers

Key 95

APGAR Score

(It is important to memorise this schedule and to know how to calculate the score as you may face this question type in the exam)

• Apgar score is used to assess the health of a newborn baby.

• It is calculated at 1 minute and 5 minutes after birth (can be repeated at 10 minutes if low score).

	Give a score of 0	Give a score of 1	Give a score of 2
Appearance	Blue or Pale all over	Blue extremities but Pink body (Acrocyanosis)	Pink all over

Pulse	Absent	< 100	> 100
Grimace **(Reflex irritability)**	No response to stimulation	Grimace on aggressive stimulation or suction	Cry, cough, sneeze on stimulation
Activity (muscle tone)	Flaccid (floppy)	Some limb flexion	Active (flexed arms and legs that resist extension)
Respiration	Absent	Weak, irregular, gasping	Strong, robust cry

A score of 0-3 is very low score,

between 4-6 is moderate low

and between 7 – 10 means the baby is in a good state

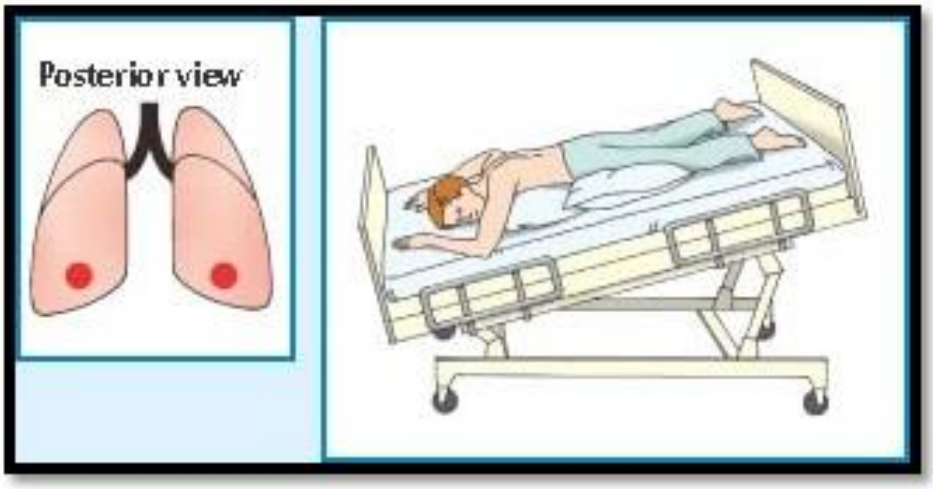
Calculate the APGAR score of the following case:

◙ HR is 90 bpm. He is blue at extremities but his body is pink. He has some limb flexion and muscle tone. He is gasping for air irregularly and grimaces on aggressive stimulation.

A → 1 ▌ P → 1 ▌ G → 1 ▌ A → 1 ▌ R → 1

The total Apgar score = **5**

Key 96	**Breast milk jaundice**. √ Starts usually in the second week of life. √ ↑ **unconjugated** "indirect" bilirubin. √ Infants are **well**. √ Advise mother to → **Continue breastfeeding** (jaundice usually disappear within 6 weeks)
Key 97	◙ **Why are there repeated pulmonary problems in cystic fibrosis patients**? → **Due to higher Viscosity of mucous**. ◙ **What is the most commonly organism affecting Chest in Cystic fibrosis**? → **Staphylococcus aureus**. Followed by Pseudomonas ◙ **If a child with cystic fibrosis presents with dyspnea and excessive mucous Secretions (productive cough) for a long period. What should be done?** → **Refer for Chest Physiotherapy** (*they have techniques to clear up the mucous such as postural drainage*)



Key 98

Remember, from the GIT Chapter:

An adolescent (12-17 YO), Intermittent episodes of Bloody diarrhea, abdominal pain, fever, weight loss ± (+ve p-ANCA) → Ulcerative Colitis

To Induce Remission:

- **Mild to Moderate UC** → Rectal **Mesalazine** → (If not responding then Oral Mesalazine). → **Topical and Oral Mesalazine**
- **Severe UC** → Admission and **IV hydrocortisone**.

♠ **Important note**

p-ANCA can be positive in UC.

However, it is **specific** to **Churg Strauss (Eosinophilic Granulomatosis with Polyangiitis)**

Churg Strauss (Eosinophilic Granulomatosis with Polyangiitis)	**Asthma, Nasal polyps, Allergic rhinitis, Eosinophilia** **+ Other organs** **e.g.** purpura, Glomerulonephritis	**p-ANCA** Eosinophilia ↑ ESR, CRP **CT → Ground-glass attenuation**
Wegener's Granulomatosis (Granulomatosis with Polyangiitis)	Upper Respiratory problems (Sinusitis/ Nasal septum perforation/ Epistaxis) + Hematuria.	**c-ANCA**

A Walk to Remember 😟

For Treatment:

- In **CD** → Pick Oral ***Prednisolone***. (1st line to induce remission)
- In **UC** → Pick ***5-ASA*** (***Mesalazine***). (1st line to induce remission)
- In **severe UC exacerbation** → Pick ***IV Hydrocortisone***.

- Mnemonic: **C**rohn's → **C**orticosteroids (prednisolone) 1st line.

Key 99

Important Causes of Hypokalemia and Hyperkalemia

HypOkalemia	HypeRkalemia
• **Loop Diuretics** (e.g. Furosemide) • **Thiazide-like diuretics** (e.g. bendroflumethiazide, indapamide) • **Vomiting** and **Diarrhea** • **Villous Adenoma** • **Renal tubular failure** • **Cushing Syndrome** • **Conn's disease** (1ry hyperaldosteronism)	• **ACE inhibitors**. • **Potassium-sparing diuretics** (e.g. Spironolactone/ Eplerenone) • **CKD**. • **Addison's** (1ry Adrenal Insufficiency). • **Congenital Adrenal Hyperplasia**.

Key 100	◙ **Remember, management of Kawasaki Disease** → **Aimed to prevent aneurysm.** ♦ **High-dose aspirin**. (low dose aspirin is given later, after settling of fever). ♦ **IV immunoglobulin**. (If given early → ↓ risk of coronary artery aneurysm). ***If "low" dose aspirin is given in the options, it would be a Wrong answer → Pick IV immunoglobulin instead.***
Key 101	**Prolonged Jaundice + DARK URINE + Pale Stool (↑ conjugated bilirubin)** → **Biliary Atresia**.
Key 102	◙ **Innocent murmur** **Asymptomatic**/ **Low intensity** (**Soft-blowing**) / **Systolic** / **Short** / **Left Sternal edge** √ Heard in **children** (mostly between 3-8 YO). √ Due to turbulent blood flow at the outflow tract of the heart. √ **More evident** in the presence of **Fever** and on a **supine position**. √ It is **Benign/ Physiologic**.

Key 103

Cow's Milk Protein Allergy

◙ If the new born is exclusively formula fed and **cow milk allergy** is suspected (+) the reaction is **Acute**

(Nausea, Vomiting, Colicky abdominal pain, Pruritus, Erythema Soon after a feed)

→ **IgE mediated reactions**

→ **Assess for cow milk protein allergy using a skin prick test or a blood test**.

◙ If the new born is exclusively formula fed and **cow milk allergy** is suspected (+) the reaction is **Delayed**

(**Reflux**, **vomiting Loose stool**, **Not gaining weight**, **Perianal redness**, **Skin manifestations like erythema, or atopic eczema**)

→ **NON-IgE mediated reactions**

→ **Change to Hypoallergenic formula**. Eg (**extensively hydrolysed formula**).

◙ If the newborn is **exclusively breastfed** and developed

(Nausea, Vomiting, Colicky abdominal pain, Pruritus, Erythema Soon after a feed)

→ **Continue breastfeeding but remove dairy from mother's diet**.

◙ If the newborn is **exclusively breastfed** and **no** symptoms of cow's milk protein allergy (there is only minimal weight loss, which is normal in the first days of a baby's life and would be returned to normal after a few weeks)

→ **Reassure the mother, advise her to continue breast feeding on demand**.

	Important Summary for milk protein allergy (asked previously). ◙ In a stem, look for the presenting symptoms in the **exclusively formula-fed** baby. If the chief complaints are things like (**not gaining weight**, **vomits after feeds**, **Constant Reflux**), this is likely → Non IgE reaction Thus, the answer is → **Change to hypoallergenic formula** as a trial. There might be a type of the hypoallergenic formula in the options, such as: **extensively hydrolysed formula**. ◙ If, on the other hand, he is not gaining weight and vomits after feeds but he is **exclusively breast fed** → **Continue breastfeeding but remove dairy from mother's diet**.
Key 104	Streptococcus agalactiae (GBS: Group B Streptococci) may lead to neonatal meningitis and septicaemia. √ **Streptococcus agalactiae** (**GBS**) is the commonest cause of early-onset neonatal infection. √ **PROM** is a risk factor for **infection** in **both** the **mother** and the **infant**.

Key 105	**Remember,** **A child with Febrile Seizure has 1/3 (30-40%) chance to develop a further episode of febrile seizure as a child (before the age of 6 years).**
Key 106	**A child presents with difficulty breathing. You suspect foreign body swallowing. The investigation needed is:** → **Laryngoscopy**
Key 107	**Baby born at 28 weeks, kept in ICU for a month then presents with bilateral conductive hearing loss. The likely cause → Serous otitis media** ***Points on hearing loss in paediatrics*** √ **Serous Otitis Media** (= **Glu ear**) (= **OM with effusion**) → **Conductive Hearing Loss**. √ **Aminoglycosides** (e.g. **Gentamicin**) **ototoxicity** → **Sensorineural Hearing Loss (SNHL)**.

	√ **Congenital infections** (e.g., **Congenital Cytomegalovirus CMV**) → **Sensorineural Hearing Loss (SNHL)**. However, the most likely outcome is → **normal development**.
Key 108	**A 14-month-old child cannot walk.** → **Reassure and review in 2 months** (We refer to developmental milestones assessment **if ≥ 18 months** and cannot walk)
Key 109	**A young girl with high fever developed a seizure. Her mother asked you about the future possibility of getting another attack. What to say?** **1/3 of cases with a Febrile convulsion** → **will have further episodes of febrile convulsion** **(if they develop fever before the age of 6 years).**
Key 110	**A child presents with Projectile, non-bilious vomiting and Palpable Almond-sized mass on the upper abdomen.**

	The investigation → **Abdominal Ultrasound** (Likely **Pyloric Stenosis**)
Key 111	**The prognosis of most cases of barking cough (Croup) is:** → **natural resolution (complete recovery)**
Key 112	**A 6-month old baby is brought by his grandmother with old and new bruises.** Suspect → **Non accidental injury**.
Key 113	**◙ A child presents with Sudden HIGH Temperature followed by non-itchy rash on CHEST or legs then spreads to body.** **The likely Dx → Roseola. (Roseola infantum)**
Key 114	**Erythema infectiosum (fifth disease) Parvovirus B19** **Children: Slapped cheek appearance (bright red rash on both cheeks, may spread to body, may be itchy if involves the feet soles)**

	A 7 YO child presents with his mother to a GP complaining with rash on cheeks sparing the nasolabial folds and the eyes. The rash started 1 day ago and soon spread on proximal limbs and trunk. He has mild fever. One of his school mates suffered from the same rash a few days ago. Management → **Rest and Analgesia**. "**Parvovirus is self-limiting**" Once the rash appears, the patient becomes non-infectious → Thus, no need to exclude from school. **A 7 YO child presents with his mother to a GP complaining with rash on cheeks sparing the nasolabial folds and the eyes. The rash started 1 day ago. He had fever, nasal discharge and malaise 1 week ago.** Management → **Reassure** (another valid answer). "**Parvovirus is self-limiting**"
Key 115	**Croup management** If not severe → **Oral dexamethasone** (is given to all croup patients).

	If severe and the patient is severely unwell → **O2 + Nebulised adrenaline** **Remember, croup features:** √ **stridor** √ **barking cough** (worse at night) "**often the hint**" √ fever √ **coryzal symptoms** √ X-ray → **Steeple sign**.
Key 116	◙ A child with high fever for 5 days, strawberry tongue, cervical lymphadenopathy. The feared complication is → **Coronary artery aneurysm** (Kawasaki disease).
Key 117	A 2 YO boy was able to walk with support when he was younger. However, he is unable to walk now. What is the next step? → Request **CK** He was able to walk earlier, thus, not a developmental milestone issue. We suspect polymyositis → order **Creatine Kinase**.
Key 118	♠ ***Suspect <u>bronchiolitis</u> in infants < 1 YO (especially 3-6 months old) and even young children who have NO Hx of Asthma, and present with cough, coryza, fever, SOB, WHEEZES and importantly difficulty feeding and breathing.***

	Management → **Supportive** (e.g., **Paracetamol**).
Key 119	◙ **P**reterm + continuous "**machinery**" murmur → **PDA**
Key 120	◙ **Projectile**, **non-bilious vomiting** "≈ 30 min" after a feed in a 3-8 weeks neonate (±) Palpable **Almond-seized mass** on the upper abdomen (±) hypochloraemic, hypokalaemic alkalosis (**Metabolic alkalosis: ↓Cl^-, ↓ K^+**). (±) A hungry baby who wants to feed regardless of the constant vomiting. → **Pyloric Stenosis** **√** Dx "recent Q" ⟶ **Abdominal Ultrasound** → **Thickened pylorus**
Key 121	◙ The appropriate test for deafness in neonates: → **ABR (auditory brainstem response)**. **Remember**:

Hearing Tests in Children

- **Below 6 Months:** - ***Otoacoustic Emissions*** (OAE), or:
  - ***Audiological Brainstem Responses*** (ABR)
- **6 Months – 18 Months** ➔ ***Distraction Testing***
- **2-4 Years:** - ***Speech Discrimination***, or:
  - ***Conditioned Response Audiometry*** (CRA)
- **5 years** ➔ ***Pure Tone Audiogram*** (PTA)

Key 122

3-year-old, drooling of saliva, temp 38.5, with stridor.

A Intravenous fluid

B **intubate and ventilate**

C. nebulize

Acute epiglottitis

◙ **Rx**

◙ **Call (Summon) anaesthetist → Intubation** "before airway obstruction occurs"

◙ **Secure His Airways**

"Drooling of saliva" → Acute epiglottitis.

Key 123	**Mother of a 3-year-old Caucasian boy is concerned about Vitamin D Deficiency in children. He is healthy, well fed and eats balanced diet. All reports and physical examination are normal. What advice would you give regarding Vitamin D requirement?** a) **400IU** b) 800IU c) 1000IU d) 3000IU e) No requirement **All** babies and young children in the UK (up to 4 years old) are encouraged to receive Vitamin D Supplements (due to the lack of the sunlight). The recommended dose for children above 1 YO is **400 IU** (equals to 10 mcg) **PER DAY** (Not Peer Week).
Key 124	**A 4-month-old girl is due for routine immunisation for pertussis. What can be an absolute contradiction for that?** a) Family history of peanut allergy. b) **Infective illness ongoing with temp of 38.5 and above**. c) Mother had febrile convulsions when she was growing.

	d) Child has neurodevelopmental delay. e) Severe eczema.
Key 125	**10 months old with generalized seizures and temperature of 39°c. Baby was vomiting and was febrile and had petechial rash. Most important investigation to carry out for diagnosis?** A. **CSF analysis** B. EEG C. FBC D. MRI brain E. Urine culture Likely Meningitis.
Key 126	**4-week-old baby having jaundice since few days after birth. She is healthy and fully breastfed. Her stool is Yellow in colour. What is the likely cause of jaundice among the following options?** A. ABO incompatibility B. Biliary atresia C. **Breast Milk Jaundice**. D. congenital rubella infection

◙ The jaundice that appears after the first 24 hours of life and **persists for > 2 weeks** is called (**Prolonged Jaundice**).

◙ The jaundice in this stem appeared a few days after birth and persisted for around 4 weeks now. So, it is a case of "Prolonged jaundice".

◙ Among the given options, both **B** and **C** are causes of prolonged Jaundice.

◙ Regarding **B** (**Biliary atresia**), there has to be a picture of **obstructive jaundice** (i.e. Pale stools, Dark urine) which is not the case here.

◙ So, the likely answer is C (**Breast milk Jaundice**).

For Clarification:

Neonatal Jaundice

♦ Jaundice in the **first 24** hrs is always **pathological**

◙ Causes of jaundice in the first 24 hrs

√ Rhesus haemolytic disease (Rh incompatibility)

√ ABO haemolytic disease (ABO incompatibility)

√ Hereditary spherocytosis

√ Glucose-6-phosphodehydrogenase (G6PD) deficiency.

◙ Jaundice in the neonate from the 2-14 days is common (up to 40%) and usually physiological. It is more commonly seen in breast fed babies

♦ If there are **still** signs of jaundice **after 14 days of delivery**, a **prolonged** jaundice screen is performed, including:

√ **Conjugated and unconjugated bilirubin**: the most important test as a raised **conjugated** bilirubin could indicate **Biliary atresia** which requires urgent surgical intervention

√ **Direct antiglobulin test** (**Coombs' test**)

√ **TFTs** (Thyroid function tests) → e.g. Congenital hypothyroidism

√ **FBC** and **blood film**/ **urine** for Microscopy, C&S and reducing sugars/ **U&Es** and **LFTs**

◙ Causes of prolonged jaundice (persists for weeks "> 14 days")

√ **Biliary atresia** → "**Obstructive Jaundice**" → ↑ **Conjugated "Direct" Bilirubin** → **Pale stool**, **Dark urine**, hepatomegaly, FTT (Failure to Thrive).

√ **Congenital Hypothyroidism** → Jaundice, **Constipation**, **dry skin**, FTT (**Failure to Thrive**), **Protruded tongue**, **flat nose**, **widely set eyes**

√ **Breast milk jaundice**

√ **Galactosaemia** → Vomiting, Diarrhea, Jaundice, FTT.

√ **Urinary tract infection** (UTI)

√ **Congenital infections** e.g. CMV, toxoplasmosis

Examples,

◙ A breastfed newborn developed jaundice at 2 day old that persisted for 7 days (day 9 after birth) and she is now non-jaundiced and with normal weight and development.

→ **Physiological jaundice**.

If persisted for a prolonged period (e.g. > 6 weeks), we can suspect "Breast milk jaundice" which is one of the causes of prolonged jaundice.

◙ An infant with: prolonged neonatal jaundice (or FHx of prolonged neonatal jaundice), **Constipation**, **dry** skin, FTT (**Failure to Thrive**), **Protruded tongue**, **flat nose**, **widely set eyes**

→ **Congenital Hypothyroidism**.

5-Week-old baby with prolonged jaundice presents with pale stool, dark urine, liver enlargement and low weight for age.

→ **Biliary Atresia**.

Request → **Direct "Conjugated" Bilirubin** → Surgery.

These are features of **obstructive jaundice** (**Pale stool**, **Dark Urine**)

Biliary Atresia is a common cause of "Prolonged" Neonatal Jaundice.

8-Week-old baby presents with jaundice, Yellow stool, Pale urine, liver enlargement, low weight, difficult feeding and Vomiting.

→ **Galactosemia**.

Here, **pale** urine → (**not** obstructive jaundice → **not** biliary atresia).

Vomiting, poor feeding, FTT and Prolonged jaundice → Galactosemia.

	Causes of prolonged jaundice (persists for weeks "> 14 days") √ **Biliary atresia** → "**Obstructive Jaundice**" → ↑ **Conjugated "Direct" Bilirubin** → **Pale stool**, **Dark urine**, hepatomegaly, FTT (Failure to Thrive). √ **Congenital Hypothyroidism** → **Jaundice**, **Constipation**, **Cold mottled dry skin**, Hypoactive, Floppy muscles, FTT (**Failure to Thrive**), **Protruded tongue**, **flat nose**, **widely set eyes** → Give Oral Levothyroxine until 2 years of age. √ **Breast milk jaundice** √ **Galactosaemia** → Vomiting, Difficulty feeding, Diarrhea, Jaundice, FTT. √ **Urinary tract infection** (UTI) √ **Congenital infections** e.g. CMV, toxoplasmosis
Key 127	**A known asthmatic child has been breathless for over 12hours. He has Oxygen saturation of 86% on high Flow Oxygen. His chest is silent. What is the most appropriate initial management?** A. IV aminophylline B. IV magnesium sulphate C. **Intubate and ventilate** D. CPAP

	Desaturating (Despite High Flow O2), Silent Chest → Going into Resp. Failure → Intubate
Key 128	**An asymptomatic child with Cytomegalovirus infection (CMV). His mother wants to know the long-term complications?** A) Blindness B) Sensorineural hearing loss C. Hydrocephalus D. Microcephaly √ **Congenital infections** (e.g., **Congenital Cytomegalovirus CMV**) → **Sensorineural Hearing Loss (SNHL)**. **The sequelae (Complications) following congenital CMV infection include sensorineural hearing loss (SNHL), retinitis, mental retardation, microcephaly, seizures, and cerebral palsy. The most common sequelae following congenital CMV infection is SNHL.**
Key 129	**A 10 months old boy presents with loose stools and persistent diarrhea. He also has lost weight over the past few months since he was weaned. Celiac disease is suspected and labs are as follows:** **Tissue transglutaminase (TTG) antibodies (IgA): Negative.** **IgA deficiency present.**

	What is the most appropriate action? → **Request IgG instead.** This child boy likely has celiac disease. As there is IgA deficiency, the negative TTG here is false negative. Thus, order IgG instead.
Key 130	**A 5 YO boy presents with bilateral lower limb pitting edema, abdominal pain, diarrhea, and puffy eyes in the morning. What is the best "NEXT" investigation?** **20.** → **Urinalysis** √ This is a likely case of Nephrotic syndrome. √ Urinalysis would show proteinuria, and it is usually the initial investigation. √ The definitive investigation is Renal Biopsy and it is not requested unless there is no response to steroids. √ Remember, minimal change disease is the commonest cause of nephrotic syndrome in children. √ Remember, boys: girls = 2:1 regarding nephrotic syndrome.
Key 131	**An 8-week-old, exclusively breastfed infant is brough by his mother into the GP with the following symptoms: vomiting small amounts of milk after most**

feeds, refusing feeds and crying shortly after feeds. He is on the 50th centile for height and weight (no faltering of growth). What is the likely diagnosis?

→ **Gastro-oesophageal reflux disease [GORD].**

GORD in pediatrics	• **< 1 YO (begins before 8 weeks of age)** • **Non-projectile vomiting after feeds**, • Gags, Chocks after feeds, • **Irritable**, **Crying**, **Difficult to feed**, • **FTT (not always, unless if severe GORD).** • Rx → Assess breastfeeding (150 ml/kg/ day) for bottle-fed • ↑ frequency and ↓ amount. • PPI or H2 blockers trial for 4 weeks. • It usually resolves spontaneously with time mostly by age of 1 year.

◙ Notes:

- *Pyloric stenosis* → **forceful (projectile) vomiting, Palpable olive mass.**
- *Intestinal obstruction* → **Bile-stained vomiting.**

Another important differential is *oesophageal atresia*:

	Oesophageal atresia	• **Early recognised before or soon after birth as any attempt at feeding could cause aspiration pneumonia.** • Associated with **tracheo-oesophageal fistula** and **polyhydramnios.** • May present with choking and **Cyanotic spells** following aspiration. • **VACTERL** associations (Vertebral, Anal, Cardiac, Trachea-Esophogeal, Renal/kidney, and Limb defects).

Key 132

A 15 YO boy presents with a lump in his neck for a few months. He is asymptomatic with no fever, night sweats or weight loss. On examination, firm non-tender lymphadenopathy is noted in the left cervical chain. What is the most appropriate investigation?

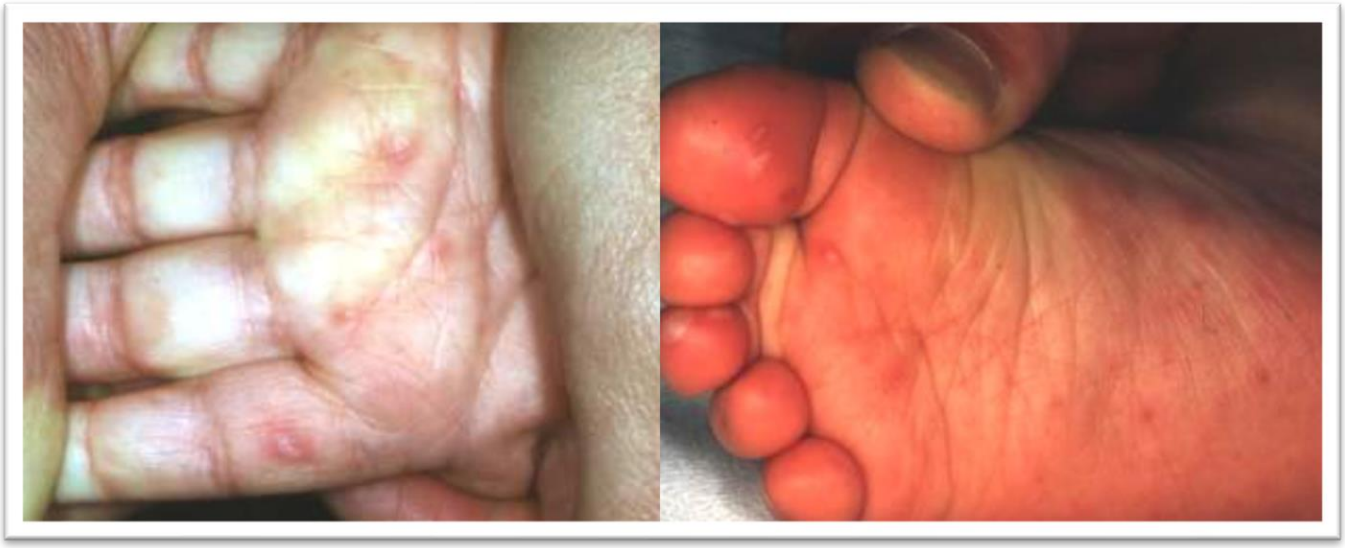
→ **Excisional Biopsy.**

◆ Hodgkin's Lymphoma

• The most common presentation of Hodgkin's lymphoma is **painless**, **firm lymphadenopathy** in one or two areas (supraclavicular/ cervical LNs).

• Remember that constitutional symptoms such as fever, night sweats and weight loss present in **only 33%** of the patients.

• **Excisional biopsy** is essential for the diagnosis.

	• Also remember that Hodgkin's lymphoma has bimodal age presentation: **<25** YO or **> 55 YO**.
Key 133	**A 2 YO girl presents with blisters and vesicles on her hands and feet with a temperature of 37.6. Th blisters are shown in the pictures below:**  → **She should not be kept from school is she is well.** **Hand, foot and mouth disease** √ Hand, foot and mouth disease is a self-limiting condition affecting children. √ It is caused by the intestinal viruses of the Picornaviridae family (most commonly coxsackie A16 and enterovirus 71). √ It is very contagious and typically occurs in outbreaks at nursery

	◙ **Clinical features:** • mild systemic upset: sore throat, fever. • oral ulcers. • followed later by vesicles on the palms and soles of the feet. ◙ **Management:** • Symptomatic treatment only. i.e. supportive: general advice about hydration and analgesia. • Reassurance no link to disease in cattle • Children do not need to be excluded from school the HPA (Health Protection Agency) recommends that children who are unwell should be kept off school until they feel better they also advise that you contact them if you suspect that there may be a large outbreak.
Key 134	**Infantile spasms** **(March 2020)** • Infantile spasms, or West syndrome, is a type of childhood epilepsy which typically presents in the first 4 to 8 months of life and is more common in male infants. They are often associated with a serious underlying condition and carry a poor prognosis.

◙ Features

√ Characteristic 'salaam' atta'ks:

→'**flexion of the head, trunk and arms followed by extension of the arms**

this lasts only 1-2 seconds but may be repeated up to 50 times

√ Progressive mental handicap

◙ Investigation

√ EEG → hypsarrhythmia in two-thirds of infants.

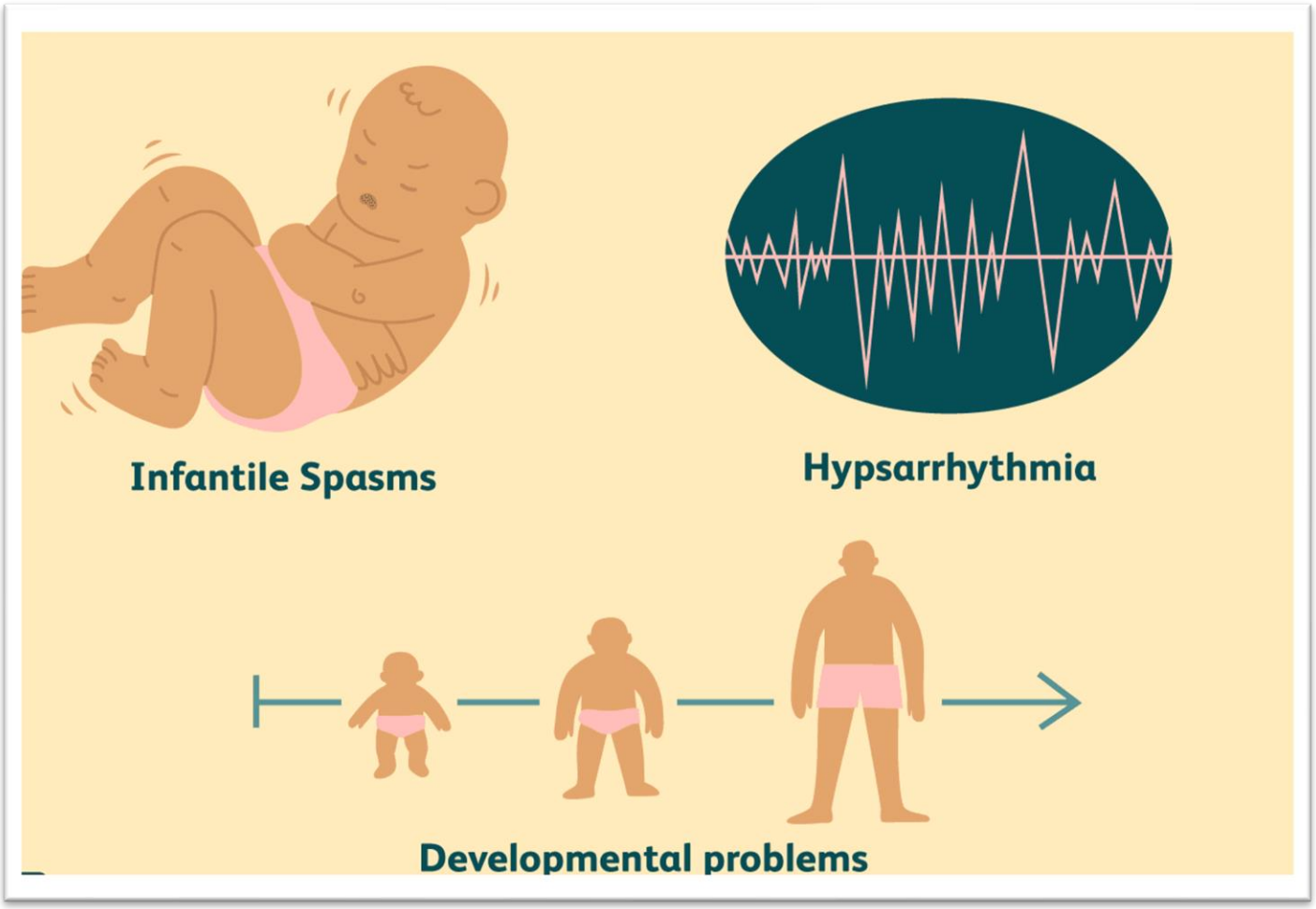
√ CT → diffuse or localised brain disease in 70% (e.g. tuberous sclerosis)

◙ Management

√ poor prognosis

√ vigabatrin is now considered first-line therapy

√ ACTH is also used



West Syndrome = Infantile Spasms

Key 135

2 Important Scenarios on Enuresis

Scenario (1):

A 5 YO boy presents to the secondary care with persistent night-time bedwetting + several incidences of day-time urinary leak. He has never been able to keep dry before. His urine dipstick is normal. He has no constipation.

He has no previous illnesses since birth. Among the following, what is the most appropriate management?

A) Enuresis alarm.
B) Intranasal desmopressin.
C) Reassurance.
D) Oral Oxybutynin.
E) Oral Nitrofurantoin.

Important:

If there was an option for (Bladder retraining) or (Behavioural therapy), pick it before (Oxybutynin).

(1ry enuresis + Daytime wetting + age > 2YO):

→ Refer to Secondar care/ Enuresis clinic.

Important causes:

- UTI ⟶ urine dipstick. (Excluded here as urine dipstick is normal).
- Chronic constipation. (He has no constipation).
- Over active bladder (urge):

Urge ⟶ Start Rx with bladder retraining or Behavioural therapy.

If not given in options ⟶ Antimuscarinics (eg, Oxybutynin, Tolterodine).

Scenario (2):

An 8-year-old boy presents to the secondary care with persistent night-time bedwetting + several incidences of day-time urinary leak. He has never been able to keep dry before. His urine dipstick is normal. He has no constipation. He has no previous illnesses since birth. Among the following, what is the most appropriate management?

A) Enuresis alarm.
B) Intranasal desmopressin.
C) Behavioural therapy.
D) Oral Oxybutynin.
E) Oral Nitrofurantoin.

(1ry enuresis + Daytime wetting + age > 2YO):

→ Refer to Secondar care/ Enuresis clinic.

Important causes:

- UTI ⟶ urine dipstick. (Excluded here as urine dipstick is normal).
- Chronic constipation. (He has no constipation).
- Over active bladder (urge):

Urge ⟶ Start Rx with bladder retraining or Behavioural therapy.

If not given in options ⟶ Antimuscarinics (eg, Oxybutynin, Tolterodine).

- **Others** → Congenital malformations, neurological disorders.

More Elaboration:

Management of Primary Enuresis

(The child has never achieved sustained continence before)

◙ **If WITH Daytime enuresis (+) > 2 YO**

→ **Refer to 2ry care or enuresis clinic** for further assessment.

This is the case here but he is already being seen in the 2ry care.

Important Causes (imp. √):

√ Urinary tract infections (need urinalysis, possibly urine culture and antibiotics).

√ Urge incontinence (Overactive bladder):

- This is treated by → Bladder retraining.

- Another valid answer is → Behavioural Therapy.

- If Bladder retraining and or Behavioural therapy are not given in the options or tried but failed, go for → Oxybutynin or Tolterodine, which are antimuscarinic drugs (anticholinergics).

√ Others: congenital malformations, chronic constipation, neurological disorders.

◙ **If WITHOUT Daytime symptoms** (only night bedwetting)

- < 5 YO → ***Reassure*** (they may achieve continence soon).

- ≥ 5 YO:

◘ If **infrequent** (<2 times a week) → ***Reassure***.

◘ If **frequent** (>2 times a week):

- **If Long-term control is required** → **Enuresis alarm** (first-line) + **Reward system**.

- **If short-term control of bedwetting is required** (**eg,** the child is going to sleep at a camp for 2 days) or > 7 YO → **Desmopressin** (temporary control).

If after 2 complete courses of treatment with alarm, reward system, desmopressin, they are still bedwetting → **Refer to 2ry care**.

However, this patient also has **daytime urine leakage**, which means he needs to be referred to a specialist (2ry care) but it is not given in the options. Therefore, as he has several urine leaks during the day with normal urine dipstick (excluding UTI), he most likely has **urge incontinence** (**overactive detrusor muscle of the urinary bladder**)

◙ Careful, all the following are asked before:

Primary Bedwetting (Enuresis) + Daytime Symptoms + (> 2 YO)

→ **Refer to secondary care or enuresis clinic**.

One important cause for this type of enuresis is urge incontinence (overactive bladder).

Other possible causes: UTI, chronic constipation, neurological disorders.

Urge incontinence (**Overactive bladder**) is treated by **Bladder retraining**.

	√ Another valid answer is → **Behavioural Therapy**. √ If Bladder retraining and or Behavioural therapy are not given in the options or tried but failed, go for → **Oxybutynin or Tolterodine**, which are antimuscarinic drugs (anticholinergics). Another important type of incontinence is **stress incontinence** which presents with urine leak on sneezing, coughing, laughing and it is treated with **pelvic floor exercise** as a first line or with free-tension **retropubic mid-urethral tape**. **Other reasons for daytime incontinence:** Overactive bladder, UTIs, Chronic constipation, Congenital malformations, Neurological disorders.
Key 136	**A 5 YO boy presents with abdominal pain and mild fever. He also complains of painful, swollen knees. 2 days ago, he developed non-blanching rash on his buttocks and the back of the legs. He had cough and runny nose 10 days ago. His vitals are stable. His labs are: normal platelets, elevated serum IgA.** **The likely Dx → Henoch-Schonlein Purpura (HSP).** • **Henoch-Schonlein Purpura** **HSP → PAAN**: non-blanching **P**urpura ± **A**rthralgia, **A**bdominal pain, **N**ephropathy (Hematuria, Proteinuria).

	• Purpura is **non-blanching** and mainly on the **buttocks** and **Lower Limbs**. • Precipitated by **URTI – Sore Throat**. • All Blood Results are **NORMAL** "Normal Hb, WBCs and Platelets". • However, there might be **↑ ESR/ IgA/ Creatinine** • It is a self-limiting condition (needs supportive Rx) unless there is renal involvement.
Key 137	**Urinary tract infection in Pediatrics** Urinary tract infections (UTI) are more common in boys until 3 months of age (due to more congenital abnormalities) after which the incidence is substantially higher in girls. At least 8% of girls and 2% of boys will have a UTI in childhood. **▣ Presentation in childhood depends on age:** • infants: poor feeding, vomiting, irritability. • younger children: abdominal pain, fever, dysuria. • older children: dysuria, frequency, haematuria. • features which may suggest an upper UTI include: temperature > 38ºC, loin pain/tenderness. **▣ NICE guidelines for checking urine sample in a child:** • if there are any symptoms or signs suggestive or a UTI.

- with unexplained fever of 38°C or higher (test urine after 24 hours at the latest).
- with an alternative site of infection but who remain unwell (consider urine test after 24 hours at the latest)

◙ Urine collection method:

- clean catch is preferable.
- if not possible, then urine collection pads should be used.
- cotton wool balls, gauze and sanitary towels are not suitable.
- invasive methods such as suprapubic aspiration (SPA) should only be used if non-invasive methods are not possible.

◙ Management:

- infants < 3 months old should always be referred immediately to a paediatrician “2ry care”.
- children aged > 3 months old with an upper UTI should be considered for admission to hospital. If not admitted, oral antibiotics such as cephalosporin or co-amoxiclav should be given for 7-10 days.
- children aged > 3 months old with a lower UTI should be treated with oral antibiotics for 3 days according to local guidelines, usually trimethoprim, nitrofurantoin, cephalosporin or amoxicillin. Parents should be asked to bring the children back if they remain unwell after 24-48 hours.
- antibiotic prophylaxis is not given after the first UTI but should be considered with recurrent UTIs.

Imaging: Urinary Tract Infections in Pediatrics

Before studying the imaging schedules, you need to know some important definitions:

◙ Straightforward: UTI that responds well to antibiotics within 48 hours → seen in most coliform group bacteria (e.g. E. coli).

◙ Atypical UTI includes:

- seriously ill.
- poor urine flow
- abdominal or bladder mass
- ↑ creatinine
- septicaemia
- failure to respond to treatment with suitable antibiotics within 48 hours
- infection with non-E. coli organisms

◙ Recurrent UTI:

- 2 or more episodes of UTI with acute pyelonephritis/upper urinary tract infection, or
- 1 episode of UTI with acute pyelonephritis/upper urinary tract infection plus one or more episode of UTI with cystitis/lower urinary tract infection, or

- 3 or more episodes of UTI with cystitis/lower urinary tract infection

The imaging modalities depend also on the age as 3 age groups exist:

< 6 months ▌6 months – 3 years ▌> 3 years

#1 Recommended imaging schedule for infants ***younger than 6 months***

Test	Responds well to treatment within 48 hours	Atypical UTI	Recurrent UTI
Ultrasound during the acute infection	No	Yes	Yes
Ultrasound within 6 weeks	Yes	No	No
DMSA 4–6 months following the acute infection	No	Yes	Yes
MCUG	No	Yes	Yes

#2 Recommended imaging schedule for infants and children *6 months and older but younger than 3 years*

Test	Responds well to treatment within 48 hours	Atypical UTI	Recurrent UTI
Ultrasound during the acute infection	No	Yes	No
Ultrasound within 6 weeks	No	No	Yes
DMSA 4–6 months following the acute infection	No	Yes	Yes
MCUG	No	No	No

#3 Recommended imaging schedule for children *3 years and older*

Test	Responds well to treatment within 48 hours	Atypical UTI	Recurrent UTI
Ultrasound during the acute infection	No	Yes	No
Ultrasound within 6 weeks	No	No	Yes
DMSA 4–6 months following the acute infection	No	No	Yes
MCUG	No	No	No

Example (1):

A 6-year-old girl had dysuria and was treated with antibiotics. The urine culture was positive for coliform bacteria. This was her first time getting a UTI. Her symptoms had disappeared 2 days after initiating antibiotics. What should be done next?

Answer → No further action is required (Reassure).

This belongs to table #3 (>3 YO), responds well to Rx within 48 hours → No imaging is needed.

Example (2):

A 2-year-old girl had dysuria and a 38-degree fever and was treated with antibiotics. The urine culture was positive for coliform bacteria. This was her first time getting a UTI. Her symptoms had disappeared 2 days after initiating antibiotics. What should be done next?

Answer → No further action is required (Reassure).

This belongs to table #2 (6 months- 3 YO), responds well to Rx within 48 hours → No imaging is needed.

Example (3):

A 5-year-old girl had dysuria and was given with antibiotics. The urine culture was sent. This was her first time getting a UTI. Her symptoms did not improve 2 days after initiating antibiotics. What should be done next?

Answer → Ultrasound during infection "urgent".

Another correct answer → DMSA 4-6 months after the acute infection.

This belongs to table #3 (>3 YO), Atypical UTI → US during infection.

Example (4):

A 2-year-old girl have had 2 episodes of lower urinary tract infection within the past year. She is now having a third episode. What should be done?

Answer → Ultrasound within 6 weeks.

Another correct answer → DMSA 4-6 months after the acute infection.

This belongs to table #3 (>3 YO), Recurrent UTI.

Key 138	**A child with Diarrhea** **+ Feeble (weak) pulse** **+ Tachycardia** **+ Hypotension** **+ Lethargy** **+ Dry mucous membranes** **+ Low urine output** **→ Severe dehydration** **The most important "initial" investigation** **→ Urea and electrolytes** **"severe hydration can lead to electrolyte imbalance which can cause morbidity and mortality and thus should be addressed as soon as possible".** **"Also note that dehydration can lead to Acute kidney injury AKI".** **"The initial and most important management here is fluid resuscitation e.g. IV fluid normal saline bolus followed by correction of electrolyte imbalance".**

Key 139	**Remember:** *Prolonged use of antibiotics can lead to a decreased immune system and thus candidiasis (Thrush).* ***Example:*** A breastfeeding mother has been treated with co-amoxiclav. Now, she is having sore nipples that are pale with shiny skin. Her baby has white spots on his tongue. What should be done? → **Give miconazole gel for the mother's nipples and miconazole oral gel for the baby**. ◙ **Common side effects of co-amoxiclav:** These may affect up to 1 in 10 people • thrush (candida – a yeast infection of the vagina, mouth or skin folds) • feeling sick (nausea), especially when taking high doses. If this applies to you, take Co-amoxiclav before food. • vomiting. • diarrhoea (in children).

Key 140

◙ 6-24 months old with paroxysmal abdominal colic **pain, CRYING**

(±) bloodstained stool – **'red-currant jelly'** – "late sign"

(±) **sausage-shaped mass** in the right upper quadrant (ileocecal).

→ **Intussusception**

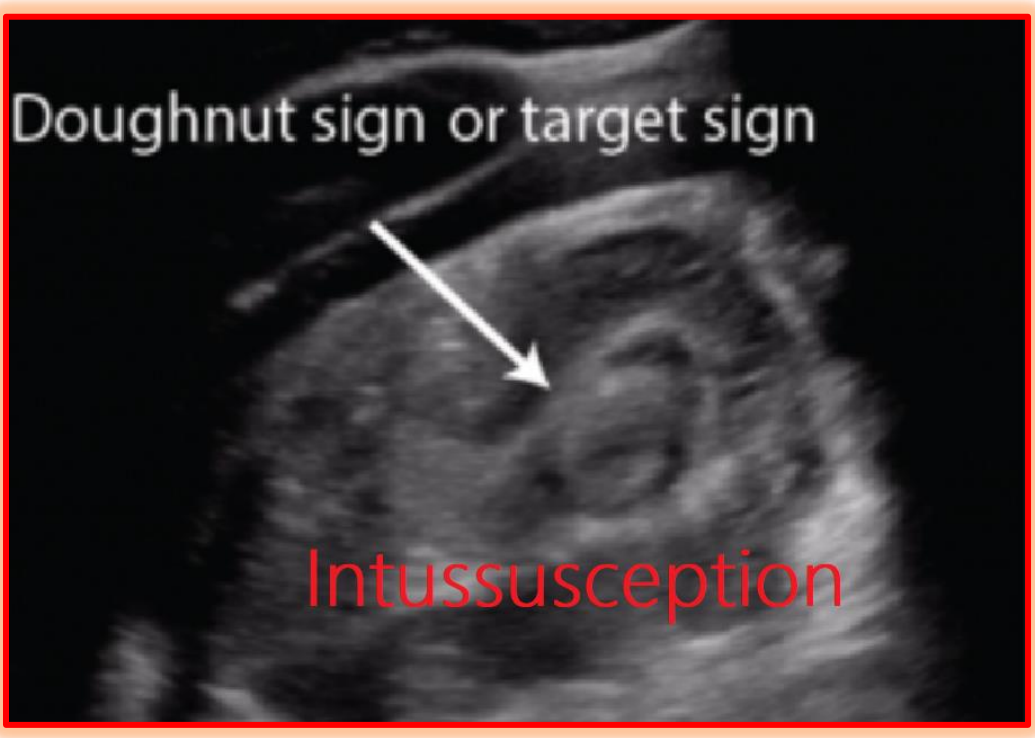
√ Dx → **Abdominal Ultrasound → Target sign/ Doughnut sign**

√ Rx→ **Mechanical reduction (first line: reduction by air enema insufflation.**

2nd: reduction by barium enema).

If failed → Surgical reduction (laparotomy)

"note: CT abdomen is the imaging modality of choice for intussusception in adults"



Abdominal ultrasound – intussusception → Doughnut/ target sign.

Key 141

Whooping Cough (Pertussis)

Whooping cough (pertussis) is an infectious disease caused by the Gram-negative bacterium *Bordetella pertussis*. It typically presents in children. There are around 1,000 cases are reported each year in the UK.

◙ Immunisation:

- infants are routinely immunised at 2, 3, 4 months and 3-5 years. Newborn infants are particularly vulnerable, which is why the vaccination campaign for pregnant women was introduced.
- neither infection nor immunisation results in lifelong protection – hence adole–cents and adults may develop whooping cough despite having had their routine immunisations.

◙ **Features**, 2-3 days of coryza precede onset of:

- **coughing bouts**: usually worse at night and after feeding, may be ended by vomiting & associated **central cyanosis.** **(Central cyanosis** affects the **lips**, but it can also affect the tongue and chest).
- An important hint in a question might be that the child has never received vaccinations.
- inspiratory whoop: not always present (caused by forced inspiration against a closed glottis).
- infants may have spells of apnoea.
- persistent coughing may cause subconjunctival haemorrhages or even anoxia leading to syncope & seizures.

- symptoms may last 10-14 weeks (not days!), and tend to be more severe in infants.
- marked lymphocytosis.

Diagnostic criteria:

Whooping cough should be suspected if a person has an acute cough that has lasted for 14 days or more without another apparent cause, and has one or more of the following features:

- Paroxysmal cough. (a bout of cough).
- Inspiratory whoop.
- Post-tussive vomiting – Central cya–osis.
- Undiagnosed apnoeic attacks in young infants.

◙ Diagnosis:

- **Per-nasal swab culture for *Bordetella pertussis*** -imp. √- may take several days or weeks to come back.

  Important: **per-nasal** swab, NOT nasopharyngeal, oral or throat wab!

- PCR and serology are now increasingly used as their availability becomes more widespread.

◙ Management:

- infants under 6 months with suspect pertussis should be admitted.
- in the UK pertussis is a notifiable disease.

- an oral macrolide (e.g. clarithromycin, azithromycin or erythromycin) is indicated if the onset of the cough is within the previous 21 days to eradicate the organism and reduce the spread.
- household contacts should be offered antibiotic prophylaxis.
- antibiotic therapy has not been shown to alter the course of the illness.
- school exclusion: 48 hours after commencing antibiotics (or 21 days from onset of symptoms if no antibiotics are given).

◙ Complications:

- subconjunctival haemorrhage
- pneumonia
- bronchiectasis
- seizures

Vaccination of pregnant women

In 2012, there was an outbreak of whooping cough (pertussis) which resulted in the death of 14 newborn children. As a temporary measure, a vaccination programme was introduced in 2012 for pregnant women. This has successfully reduced the number of cases of whooping cough (the vaccine is thought to be more than 90% effective in preventing newborns developing whooping cough). It was however decided in 2014 to extend the whooping cough vaccination programme for pregnant women. This decision was taken as there was a ‘great deal o‘ uncertainty’ about the t’ming of future outbreaks.

Women who are between 20-32 weeks pregnant will be offered the vaccine.

Remember:

◙ It is recommended in the UK that pregnant women receive

IP Vaccines → **Influenza + Pertussis** "Whooping cough"

(***Cough*** *and* ***Sneeze*** *vaccine =* ***Whooping cough*** ***(pertussis)*** *and* ***Influenza***)

√ Note, Pertussis vaccine is not available alone, it comes as a part of the DPT vaccine (Diphtheria, Tetanus, Pertussis).

√ So, pregnant women in the UK are advised to receive **Influenza** and **DPT** vaccines (between **20-32 weeks** of gestation).

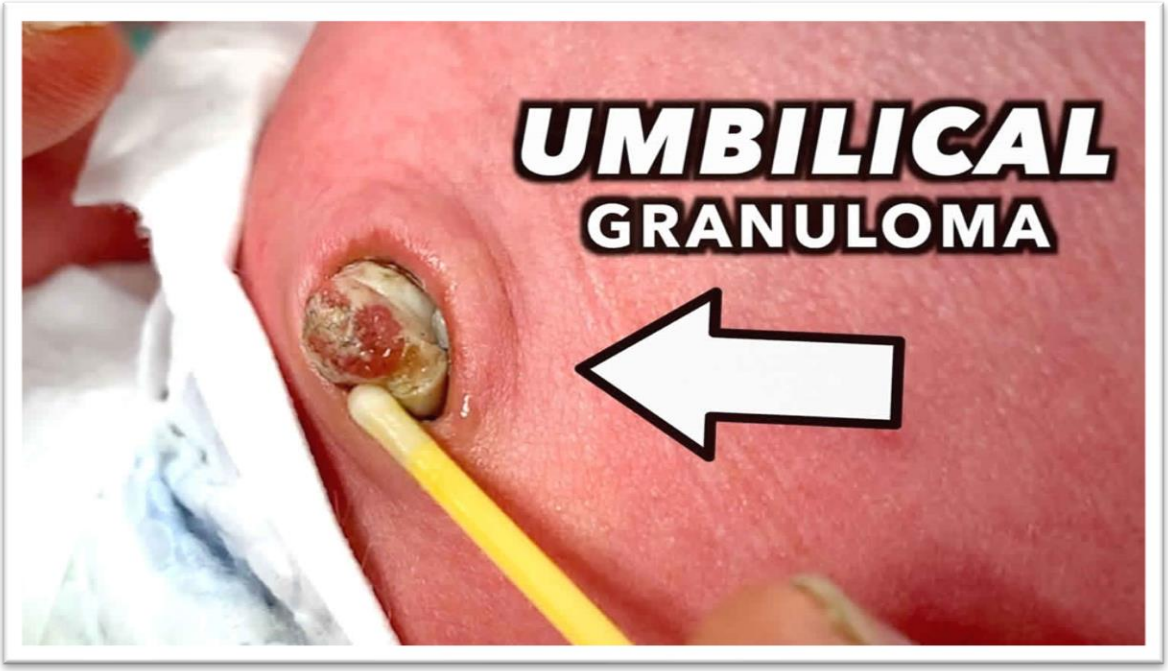
Example:

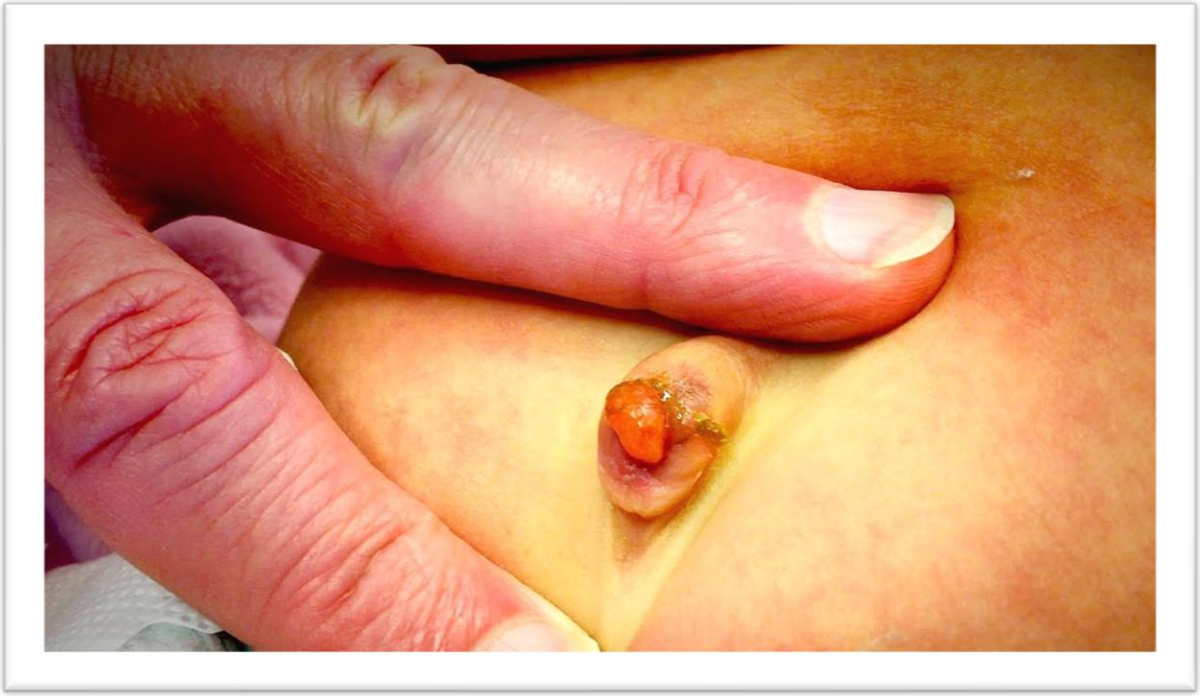
A 9 months old infant presented to the A&E with his mother as she complains that her baby is having bout of cough that are increasing in severity for the past 9 days. On examination, the child was noted to have bouts of cough followed by blue lips. The child has never been immunised because his parents are against vaccination. What is the best investigation?

- Dx → Likely **pertussis "whooping cough"**.
- Ix → **Pernasal or nasopharyngeal swabs for culture**.
- Second-line Ix → PCR and serology.

Looking for Bordetella pertussis.

Key 142	**Baby, vomits shortly after every feed, cries, sometimes refuses feeds, the growth is sometimes normal and sometimes affected.** Think → **GORD**. Next step in management → **Prescribe Gaviscon** (alginates). **Other lines:** Small amounts and frequent feeds, keep him upright for 20-30 min after feeds, Gaviscon is tried before PPIs.
Key 143	**Umbilical granuloma** An umbilical granuloma is a moist, red lump of tissue that can form on a baby's navel (bel'y button). It can be seen in the first few weeks of life, after the umbilical cord has dried and fallen off. It's usually a 'inor problem that looks worse than it is. An umbilical granuloma does not cause pain. **Management**: √ If **no** signs of infections → Table salt "first-line" / Silver nitrate "2nd-line". √ If **with** signs of infection e.g., pus → Fusidic acid.





Key 144	◙ Remember, **Atrioventricular septal defect** (AVSD) is the most common congenital heart defect in people with **down syndrome**. Look for: systolic murmur, single palmar crease, short broad hands, flat nasal bridge and epicanthic fold.

Key 145	**Osteomyelitis** Osteomyelitis describes an infection of the bone. It may be subclassified into: **Haematogenous osteomyelitis** • results from bacteraemia • is usually monomicrobial • most common form in children • *vertebral* osteomyelitis is the most common form of haematogenous osteomyelitis in adults. • Risk factors include: sickle cell anaemia, intravenous drug user, immunosuppression due to either medication or HIV, infective endocarditis **Non-haematogenous osteomyelitis:** • results from the contiguous spread of infection from adjacent soft tissues to the bone or from direct injury/trauma to bone

- is often polymicrobial
- most common form in adults
- risk factors include: diabetic foot ulcers/pressure sores, diabetes mellitus, peripheral arterial disease

◙ Microbiology

Staph. Aureus is the most common cause except in patients with sickle-cell anaemia where Salmonella species predominate.

◙ Investigations

MRI is the imaging modality of choice, with a sensitivity of 90-100% (**imp √**).

◙ Management

√ flucloxacillin for 6 weeks

√ clindamycin if penicillin-allergic

Example:

A 15 YO boy had a penetrating wound a few days ago. Today, it has developed into an ulcer. He is limping and unable to bear weigh and there is severe pain. O/E: fever 39, HR 110, redness and increased warmth over the plater aspect of the first metatarsal.

	√ The likely Dx → Osteomyelitis. √ The most common causative organism → Staphylococcus aureus.
Key 146	**A 9 YO girl presents to a clinic with her mother complaining of ongoing abdominal pain for a month. The pain is episodic, periumbilical, associated with migraine, lasts for more than an hour and affecting her activities. She misses school because of the pain. She has a good weight and appetite. Her labs including FBC, urea and electrolytes are normal. Her family are facing a shock nowadays because her mother has recently been diagnosed of breast cancer. What is the most appropriate management?** A) CT abdomen. B) US abdomen. C) Refer to a paediatrician. D) Obtain more history from teachers and family. E) Same-day admission to a hospital. She may be psychologically affected by her mother's recent diagnosis and pretends this abdominal pain in order to skip the school as she is in shock and wants not to go to school. Thus, the next appropriate step is to explore whether she is enjoying school or not. Another possible DDx is abdominal migraine.

Key 147

◙ Fluid Replacement in Paediatrics:

◘ Clinical dehydration signs:

√ Sunken eyes.

√ Reduced skin turgor.

√ Irritable lethargic "altered responsiveness".

√ Tachypnea.

√ Tachycardia.

◘ IV fluid resuscitation (bolus):

For moderate to severe dehydration, give IV normal saline as a bolus over less than 10 minutes as follows:

√ **for term neonate** (first 28 days in life): **10-20 ml per Kg**.

√ **for children and young people**: **20 ml per Kg**.

***Note**, if the is an underlying cardiac or renal problem, smaller volumes are needed.*

Example:

An 8 months old baby presents with sunken eyes and tachycardia. He has not drunk any milk since yesterday. His weigh is 8 kg. What is the required IV NS bolus?

→ 8 X 20 = **160 ml** over less than 10 minutes.

◘ IV fluid for routine maintenance:

Use the Holliday-segar formula: **100** → **50** → **20**

For the first 10 kg of the weight → **100** ml/kg/day

For the second 10 kg → **50** ml/kg/day

For the rest of the weight → **20** ml/kg/day

Example:

What is the maintenance IV fluid for a child who weighs 33 kg?

First 10 kg → **100** X 10 = 1000 ml

2nd 10 kg → **50** X 10 = 500 ml

The remaining kgs are 13 → **20** X 13 = 260

So, the maintenance IV fluid for 24 hours is:

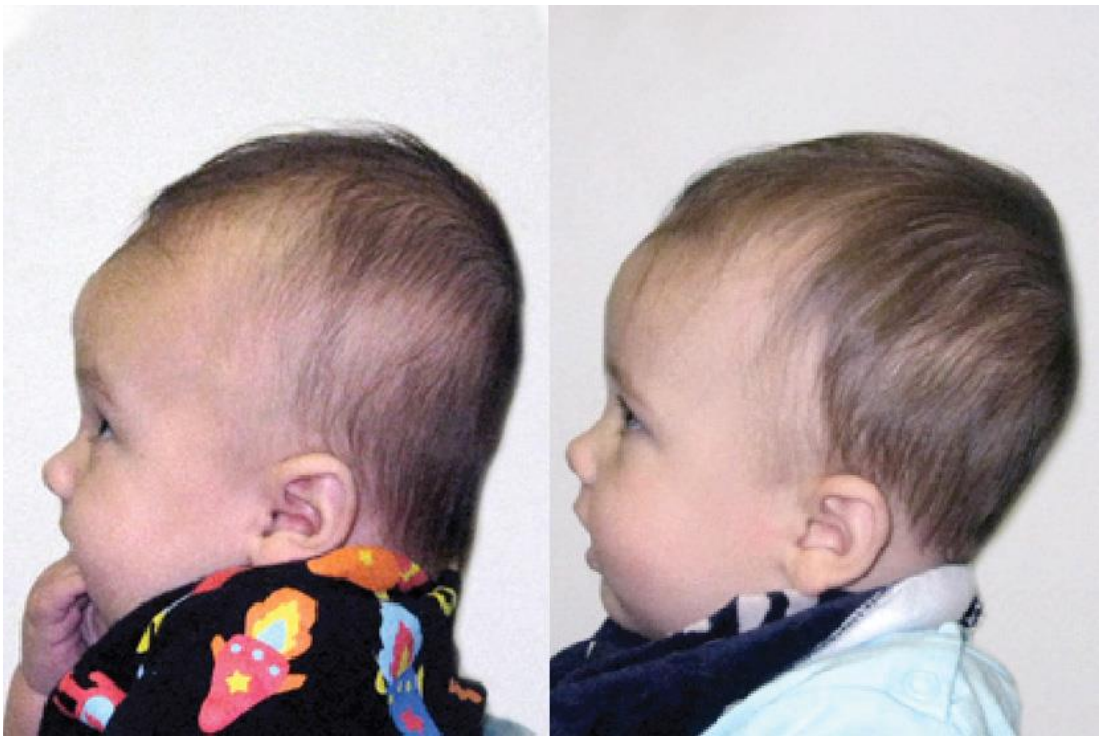
1000 + 500 + 260 = **1760** ml/ 24 hours.

To obtain the rate per hour, divide it by 24:

→ 1760 / 24

	= **73.3 ml/hour**.
Key 148	**A 10 YO boy was admitted to a hospital for acute tonsillitis. He was given IV antibiotics followed by oral antibiotics. He has improved now and fit for discharge. However, the treating team has noticed there are enlarged cervical lymph nodes of 1 cm bilaterally. His FBC are normal except for a slight increase in WBC (11.5). What should be done?** → Reassure and continue to discharge him. • It is normal to have reactive lymphadenopathy after an acute infection. Reassure as it would resolve in a few days. • A slightly elevated WBCs are also normal post-infection. They would return to normal within a few days. • **When to worry?** More than one of the following would require an urgent referral: √ LNs are firm and non-tender. √ LNs are hard. √ LNs are progressively enlarging. √ LNs are > 2 cm.

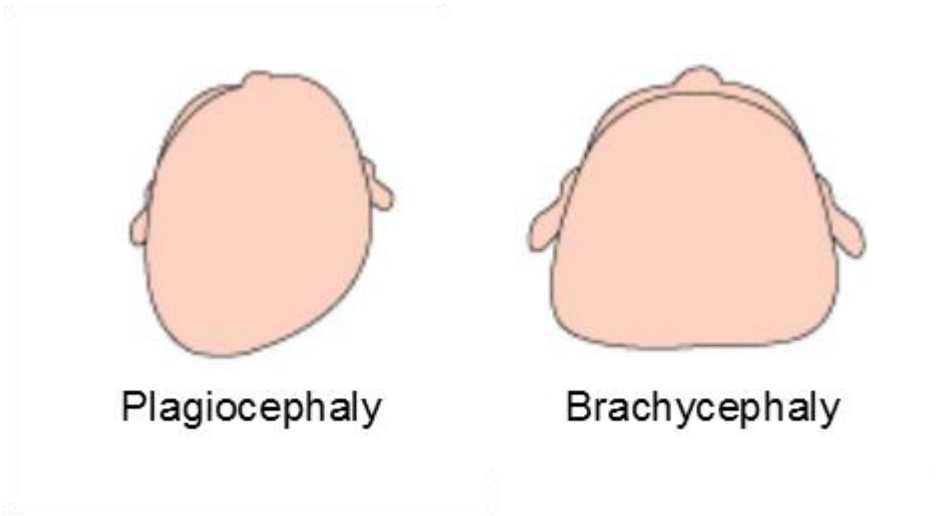
Key 149	**A 6-week-old breastfed baby is still having jaundice. He is not gaining weight appropriately. What investigation should be requested?** **One of the important treatable causes for prolonged jaundice (> 2 weeks) is biliary atresia.** **This baby needs → Liver function tests and conjugated bilirubin to begin with.** **Remember:** **√ Biliary atresia → "Obstructive Jaundice" → ↑ Conjugated "Direct" Bilirubin → Pale stool, Dark urine**, hepatomegaly, FTT (Failure to Thrive).
Key 150	**A 6-week-old baby is brought by his mother to the paediatric ER for having high fever (39C), persistent cough, not wetting his nappies for 24 hours, and not feeding well. O/E, his temp. is 38.3, RR is 50 breath per minute, HR 130 bpm, O2 saturation is 96%. He has fine crackles and expiratory wheeze. What is the most appropriate action?** The likely Dx here is → Bronchiolitis. This baby needs → Admission for further observation. • Note that not passing urine for 24 hours is a serious sign therefore this baby needs admission as he likely lacks adequate oral intake.

	• Also, babies < 3 months of age are susceptible to a more severe form of bronchiolitis. • Antibiotics are not within the management of bronchiolitis. • His O2 is above 92%, thus, O2 is not the right answer.
Key 151	**Plagiocephaly and Brachycephaly (flat head syndrome)**  **Babies sometimes develop a flattened head when they're a few mon'hs old, usually as a result of them spending a lot of time lying on their back.** This is known as flat head syndrome, and there are 2 main types: • plagiocephaly – the head is flattened on 1 side, causing it to look asymmetrical; the ears may be misaligned and the head looks like a

parallelogram when seen from above, and sometimes the forehead and face may bulge a little on the flat side

- brachycephaly – the back of the head becomes flattened, causing the head to widen, and occasionally the forehead bulges out

These problems are quite common, affecting around 1 in every 5 babies at some point.



In most cases they aren't a major ca'se for concern, as they don't have any e'fect on the brain and the head shape will often improve by itself over time.

Your baby won't experience'any pain or other symptoms, or any problems with their general development.

◙ What causes plagiocephaly?

The skull is made up of plates of bone that strengthen and join together as a child gets older.

A young baby's skull is s'ill relatively soft and can change shape if there's constant p'essure on a particular part of their head.

Reasons why this may happen include:

- sleeping on their back – the back or side of a baby's head can b'come flattened as a result of always sleeping on their back, but it's important 'hey do this to reduce the risk of sudden infant death syndrome (SIDS)
- problems in the womb – pressure can be placed on a baby's head before it's born if they're a bit squashed in the womb or there's a lack of amniotic fluid to cushion them
- being born prematurely – premature babies are more likely to develop a flattened head because their skull is softer when they're born, and they may prefer to rest their head on 1 side at first as they're not yet able to move their head themselves
- neck muscle tightness – this can prevent a baby turning their head a particular way, meaning 1 side of their head is placed under more pressure

Occasionally, a flattened head can be caused by the plates of the skull joining together too early. This is known as **craniosynostosis**.

◙ What can be done?

The shape of the baby's head should improve naturally over time as their skull develops and they start moving their head, rolling around and crawling.

To take pressure off the flattened part of your baby's head:

- give your baby time on their tummy during the day – encourage them to try new positions during play time, but make sure they always sleep on their back as this is safest for them
- switch your baby between a sloping chair, a sling and a flat surface – this ensures there isn't constant pressure on 1 part of their head
- change the position of toys and mobiles in their cot – this will encourage your baby to turn their head on to the non-flattened side
- alternate the side you hold your baby when feeding and carrying
- reduce the time your baby spends lying on a firm flat surface, such as car seats and prams – try using a sling or front carrier when practical

If your baby has difficulty turning their head, physiotherapy may help loosen and strengthen their neck muscles.

(important: if the neck muscles are not restricted from the beginning, physiotherapy is incorrect answer).

Corrective surgery may be needed if they have craniosynostosis.

◙ Helmets, headbands and mattresses → Not recommended by NICE because of: inconvenience, expense and possible discomfort for you and your child.

Will the child's head shape return to normal?

Mild flattening of the head will usually improve if you use the simple measures described on this page, although it may be a couple of months before you start to notice an improvement.

Your baby's head may not return to a completely perfect shape, but by the time they're 1 or 2 years old any flattening will be barely noticeable.

More severe cases will also get better over time, although some flattening will usually remain.

The appearance of your child's head should improve as they become more mobile and their hair grows.

It's very rare for a child to experience problems such as teasing when they reach school age.

In a recent exam, the answer was → Reassure.

Key 152

Dysgraphia (the deficiency in the ability to write)

→ a neurological disorder of written expression that impairs writing ability and fine motor skills. It is a learning disability that affects children and adults, and interferes with practically all aspects of the writing process, including spelling, legibility, word spacing and sizing, and expression.

	Recently asked **To which team do we refer a child with difficulty in writing?** → **Educational psychologists**.

Key 153	• Only ↓ **Platelets** + Bleeding/ Purpura ± Hx of URTI → ITP "**Idiopathic Thrombocytopenic Purpura**) **Management of ITP:** √ Prednisolone. √ IV immunoglobulins. √ Admit to paediatric ward "not ENT ward". √ Platelets transfusion "**only** recommended if there are life-threatening bleeds e.g., intracranial bleeding. In a recent exam, the answer was → Give IV immunoglobulins and admit to the paediatric ward.
Key 154	**IMPORTANT** ◙ A sudden **HIGH fever** in a child followed by **Rash on Chest**, body, legs

(BUT **NOT** ON HEAD and NECK)

→ **Roseola** **(Roseola infantum)**

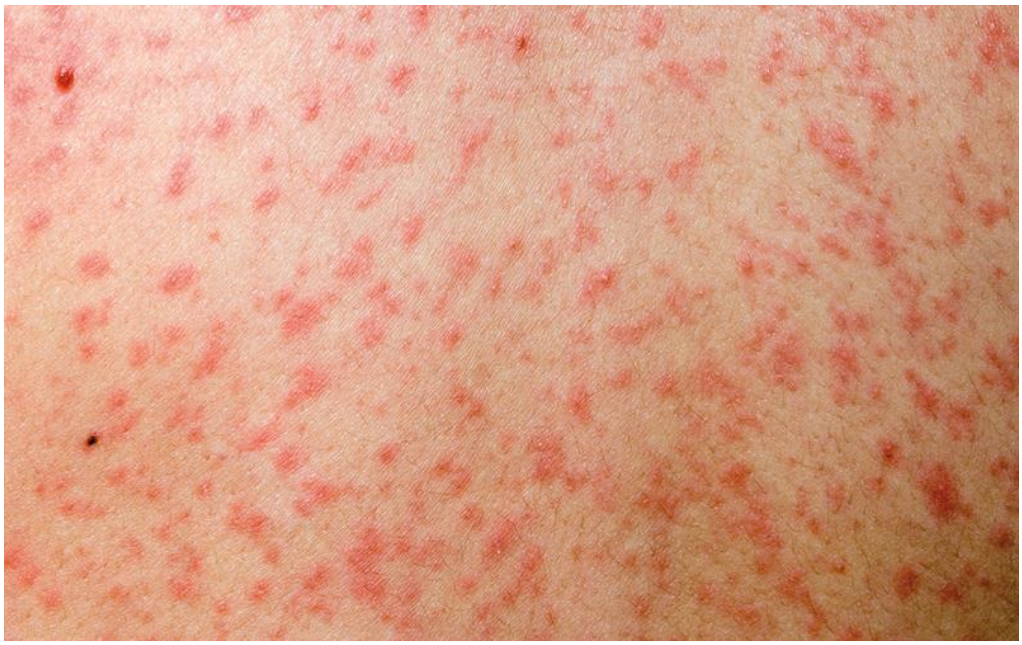
◙ Fever + **irritable unwell** child + **red-brown blotchy rash** "often **itchy**" on **face** then spreads to body ± **White centre spots** on the oral cavity (Koplik spots)

→ **Measles**.

◙ Fever + cough, rhinorrhea (coryza) + conjunctivitis, "Koplik spots are not always mentioned)

→ **Measles**. "Remember, scarlet fever always has sore throat".

RECENTLY ASKED



Example of measles rash

	◙ **Mild** Fever, Rash **behind ear**/ on face then spreads to body + **Lymphadenopathy** → **Rubella**. √ Note that (measles) and (Rubella) tend not to appear in children who are Fully Immunised. ♦ Rx in these cases → **Supportive (paracetamol/ ibuprofen) + Reassurance**
Key 155	**Ophthalmia neonatorum** (ON) refers to any conjunctivitis occurring in the first 28 days of life. Originally, the term neonatal ophthalmia referred to conjunctivitis in the newborn caused by Neisseria gonorrhoeae, but now the term is used for any conjunctivitis in this age group, irrespective of cause. If there is purulent discharge + swelling of eyelid OR injected conjunctiva → **Refer to 2ry care immediately**. For further assessment e.g., culture of the discharge. If Chlamydia → erythromycin orally. If Gonorrhea → ceftriaxone IV.

Key 156	**Q1) A 2-week baby presents with purulent discharge from his eyes. He has red eyes (injected conjunctiva).** → **refer to 2ry care immediately** (Ophthalmia neonatorum).

	Q2) A 5-week-old baby is brought by his mother. He has left eye discharge "sticky" for 5 days. No eye redness or eyelid swelling. → **Reassure** (likely blocked nasolacrimal duct; the commonest reason for eye discharge in those < 12 months old. Simple messaging of the duct may help).
Key 157	**A 2 YO child suddenly started to have seizure for 4 minutes. He had no head injury. He does not have fever. He eats and drinks and plays well. Next step?** → **Capillary blood glucose**. It is important to rule out **hypoglycemia** as it is a very common cause of **seizure** in an **afebrile child**.
Key 158	**A 24-month-old child can eat with a spoon by herself, climb stairs and chairs. She CANNOT use a knife to cut her food. She can draw a line but cannot draw a circle. She can say dada and mama but nothing beyond that. What is the best description for her developmental milestone?** → **Delayed Verbal "Language" Development.** **Review key (20).**

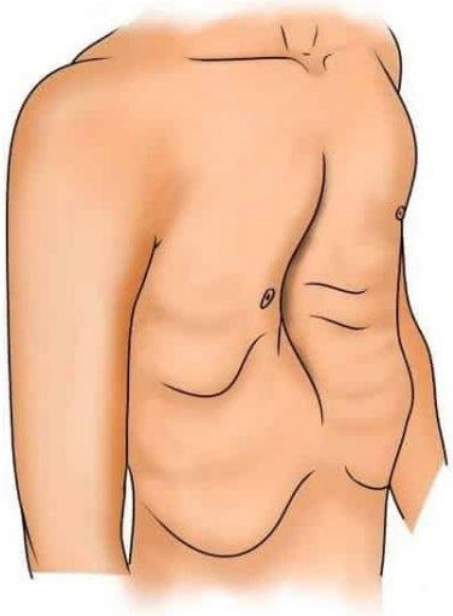
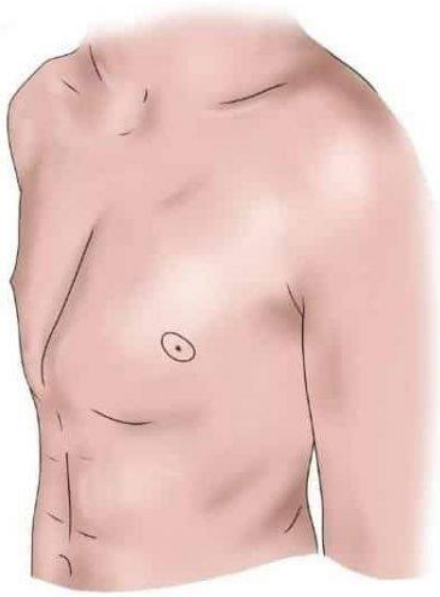
	20 – 24 months	Joins two or more words to make simple phrases *"Give me teddy"*
Key 159	**A child > 3 YO, recurrent UTI** **√** The **first** scan to be done → Ultrasound "within 6 weeks of the last UTI". **√ Further** scan → DMSA = dimercaptosuccinic acid", "To look for renal scarring, 4-6 months after the acute infection".
Key 160	**A newborn girl aged 18 days has been having a prolonged jaundice that has been gradually worsening over the last 10 days. She is breastfed exclusively since birth. She grows well. She wets her nappies.** **Conjugated bilirubin 35 (high)** **Unconjugated bilirubin 130 (high)** **Among the following causes of prolonged jaundice, what is the most likely diagnosis?** • Biliary atresia? → **No**, in biliary atresia, conjugated bilirubin would be much higher than unconjugated bilirubin. Also, there would most likely be a failure to thrive, this baby grows well.

	• Hypothyroidism? → **No**, there are no features of hypothyroidism mentioned. Besides, she wets her nappies, no constipation. • Breast milk jaundice? → **Yes**, in breast milk jaundice, babies are usually well aside from jaundice. It appears mostly in the second week of life. It resolves simultaneously within 6 weeks or up to 4 months. It is the most common cause of "Unconjugated" hyperbilirubinemia in babies.
Key 161	**A 2 YO girl is brought to the ER by her mother. The child has hand twitches for a few minutes. Her temperature is 39. She is crying and restless. What is the next step in management?** → **Paracetamol**. √ We have to lower the fever. √ Rectal diazepam or buccal midazolam are given when there is a seizure that is lasting > 5 minutes. This child does not have seizure now.
Key 162	**A 5 weeks old baby presents with repetitive projectile non-bilious vomiting especially after feeding. There is right-sided abdominal mass.** **What is the most likely result that would be seen in blood tests?** → **Metabolic alkalosis**. Likely pyloric stenosis, Dx is done by abdominal U/S In blood tests, we will find → Metabolic alkalosis: ↓Cl^-, ↓ K^+

Key 163	**A 4 YO female child is brought by her father to the A&E. She has fallen from her bed (around 3 feet) and hit her left arm. On X-ray, there is spiral fracture in the humerus. There is another healed fracture of the humerus. What is the likely Dx?** → **Non-accidental injury**. • Spiral fracture = torsion fracture (due to a rotation or twisting force). • This fracture's mechanism is not in line with the provided history (fall from a height). It needs pulling, rotation, twisting power. • So, she is most likely getting abused (non-accidental injury) • The old healed fracture also supports this diagnosis.
Key 164	**A 13 YO boy was staying with his friends last night. He has Hx of asthma. He missed some doses of his inhalers. He also has Hx of eczema and food allergies. He had eaten different kinds of food with his friends. Today, he presents to the hospital with shortness of breath, inspiratory stridor and whole-body rash. He is tachypnic and with tachycardia. He looks drowsy. What is the likely Dx and the most appropriate management?** He likely has **Anaphylaxis** (stridor, rash, drowsy) likely 2ry to food allergy. Asthma here is a distractor. Asthma does not present with stridor. **Rx** → **IM adrenaline (epinephrine)**.

	In Allergic reaction with urticaria → **Oral Anti-histamine** **e.g. Cetirizine, Loratadine** If Anaphylaxis (e.g., Difficulty breathing) → **IM Adrenaline** ** ***Indications of IM Adrenaline in Anaphylaxis:*** - *Hoarseness of voice*, - *Wheezes*, - *SOB*, - *Stridor*, - *Shock*, - *Facial*, *Tongue*, or *Cheek swelling*.
Key 165	**A child with cerebral palsy has muscle spasm and increased muscle tone. What medications can help relieve this muscle spasticity?** → **Baclofen**. **Another useful medication to know → Botulinum toxin (botox).**

Key 166	Asthma exacerbation, no response to bronchodilators or steroids, **silent chest** → **intubate**. Asthma exacerbation, no response to bronchodilators or steroids, O2 sat is >90%, a child can speak. Next step → **IV magnesium sulphate**. (IV Aminophylline (unlikely to be the correct answer as it is given by seniors in severe life-threatening asthma exacerbations that have failed to respond to the max doses of bronchodilators and steroids)
Key 167	The diagnosis of these 2 pictures (these structural abnormalities usually start since birth). If they affect respiration or cardiac function, cardiothoracic surgery for correction may be indicated. If not affecting → No Rx may be needed.

	 Pectus Excavatum  Pectus Carinatum Ex**cav**atum → **Cav**e (sternum is inward).
Key 168	In cases of gastroenteritis (diarrhea, vomiting) that has led to **dehydration** (eg, sunken eyes, hypotension, dry skin and lips, pallor) → Give **BOLUS** of IV fluids over **10 minutes**. (Then re-asses. Boluses can be repeated in the first hour based on reassessment).
Key 169	**Q1)** A 2 YO boy was able to walk with support when he was younger. However, he is unable to walk now. What is the next step? → Request **CK**

He was able to walk earlier, thus, not a developmental milestone issue.

We suspect polymyositis → request **Creatine Kinase**.

Q2) A 2 YO **boy** was able to walk with support when he was younger. However, he is unable to walk now. He has Gower's sign → the boy uses his hands to push on his legs to stand. He also has waddling unsteady gait. What is the next step?

→ Request **Creatine Kinase [CK]**

Boy + **Gower's sign** + **Waddling unsteady gait** + (No other neurological features)

- Think → Duchenne muscular dystrophy **DMD** → Request **creatine kinase**.
- Followed tests would be → Muscle biopsy – Genetic testing.
- X-linked recessive conditions as DMD (affects boys only, with 50% possibility of a boy to be affected if his mother is a carrier).
- Girls are carriers and thus features of DMD would not be prominent.

Q3) A 2 YO **GIRL** was able to walk with support when she was younger. However, she is unable to walk well now. She has Gower's sign (ie, she uses her hands to push on her legs to stand). She also has delays with the development of speech and fine motor skills. She also has waddling unsteady gait. What is the most appropriate next step?

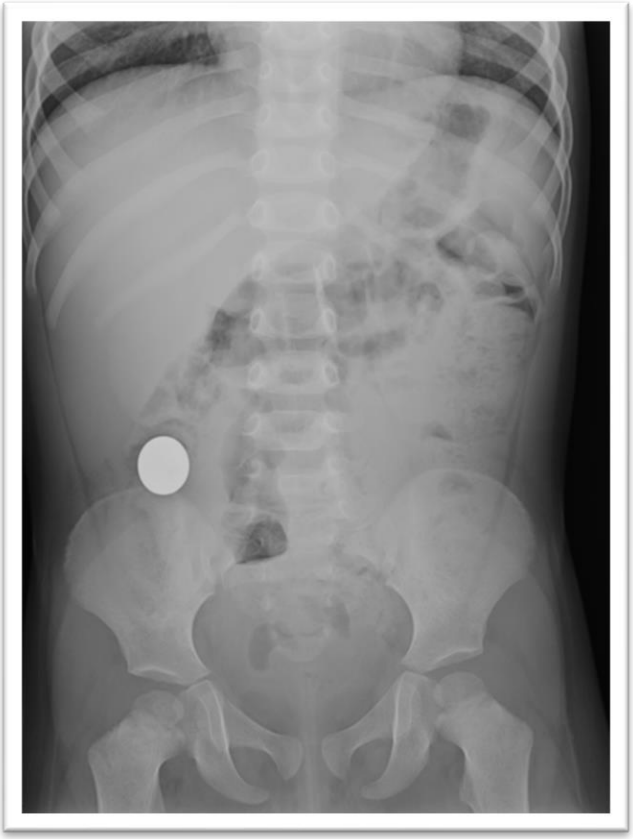
→ Refer to paediatric neurology

	• This is not a case of Duchenne Muscular Dystrophy (DMD). DMD is X-linked Recessive (ie, it affects MALES) She is a girl; thus, it is not DMD → (thus, request Creatine Kinase [CK] is wrong). • She also had delayed speech and fine motor. This raise the possibility of it being a neurological condition. Paediatrics neurology team would investigate more. One of the likely causes is Rett's syndrome. ◙ **Rett's syndrome** → Normal development until 2-3 YO. After that → **Re**gression in motor, social, language, coordination skills. It is a *neurological* issue. (Ie, it needs pediatric neurology). --- *All the above three cases were asked on previous exams.*
Key 170	**In infant's CPR:** **Seal (cover) BOTH the mouth and nose of the infant with your mouth before blowing.**

Key 171

Swallowing a Coin – Asymptomatic Child:

A 2 YO boy has ingested a coin. The coin is seen in the small intestine by X-ray. The boy is asymptomatic. No abdominal pain or vomiting. What to do?



Reassure and a Watchful Wait approach is recommended.

DO NO HARM Rule:

• This means, **no** surgery or endoscopy or repeated X-rays "radiations" are required as the boy is **asymptomatic**. In most cases, the coin would pass in stools in a few days.

•Remember, once the blunt object (eg, coin) passes down **below the level of the diaphragm,** it is usually a **benign** case.

	√ The best answer would be to **advise parents to come back if abdominal pain or vomiting develop**. √ If this is **not** in the options, pick → **Reassure**. √ If the above 2 answers are **not** given, pick → **Advise parents to check stools until the coin is seen** (least favourable as this is unpleasant).
Key 172	**An 18-month-old child is brough by his parents to the GP. Over the past few months, he has lost weight, has been having abdominal distension, loose stools that are greasy and smelly. He looks pale and thin. The skin over his buttocks is loose. No abdominal mass or perioral or perianal lesions. He eats like his family.** **The most likely Dx → Celiac disease.** √ He eats like his family (so, probably eating gluten). √ Malabsorption in celiac leads to → loose smelly fatty stool, weight loss, anemia (pallor). √ Cow milk protein allergy is not common at this age. It is common in the first few months of age. Also, this child eats what his family eat. √ Crohn's disease is very rare in this age.
Key 173	**An asthmatic girl whose age is 12 years fell down and twisted her right ankle. There is swelling at her lateral malleolus. There is no obvious**

	distortion and she is able to bear weight on her right foot. She is diagnosed as lateral ankle sprain which needs only rest and analgesia. What kind of analgesia is suitable for this girl? → **Paracetamol.** ◙ **Rx** of **Ankle Sprain** in most cases is **conservative**: Rest, Ice, Compression and Elevation, Analgesics (Paracetamol ± NSAIDs) However, NSAIDs (eg, ibuprofen) **should be avoided** in this girl as it may worsen the asthma symptoms.
Key 174	**A 9-year-old boy was presented to the A&E department with chest discomfort and palpitations that started 7 hours ago. He feels dizzy. His ECG shows supraventricular tachycardia with a rate of 250 beats per minute. What is the management?** **A) Adenosine.** **B) Magnesium.** **C) Atenolol.** **D) Verapamil.** **E) Atropine.** **The answer is → (A): Adenosine.** (No Valsalva maneuver or carotid massage are given in the options). **Supraventricular tachycardia** is the most common heart arrhythmia in children (especially school-aged children).

	◙ Management of Supraventricular Tachycardia ♠ **Initial line** → **Valsalva manoeuvre**, **Carotid massage**, Immersion of face in ice water for a few seconds (for **infants**). ♠ **Not improved?** → Intravenous **adenosine** (Rapid IV Bolus), still not improved? ⟶ give additional double **adenosine**, still not improved? ⟶ give another double dose **adenosine.** N.B. **Adenosine** is contraindicated in **asthmatics** → **Verapamil (CCB)** is the preferred option in SVT in a patient with **Asthma**. Or after several attempts of failed adenosine. Not recommended in children ♠ **Still not improved?** → Electrical DC "**Cardioversion**" • **Prevention of future episodes** → **ß-Blockers** or **Radio-frequency ablation.**
Key 175	**Delivering Breaths as a part of the CPR:** • **In infants:** Cover (steal) both the nose and the mouth of the infant by your mouth to prevent air escape and then blow the breath. • **If a larger infant or a child** Cover (steal) one entry and close the other. Eg, if you steal the nose of the child with your mouth, close his lips to prevent air escape.

	• **In adults:** Cover (steal) his mouth by your mouth and pinch the nose by your fingers.
Key 176	**A 10-month-old baby is brought by his mother. He has left eye clear discharge "sticky" for 5 days. No eye redness or eyelid swelling.** → **Reassure** (Likely **blocked nasolacrimal duct**; the commonest reason for eye discharge in those < 12 months old. Simple massaging of the duct may help). **Other valid answers:** → **Advise to clean eyes with sterile water**. → **Simple massage of the nasolacrimal ducts**.
Key 177	**A 7-year-old boy had a hot ironing machine fallen on his hand. He is screaming and crying of severe pain. There is around 10% partial thickness burn on his hand. What is the most appropriate medication to give?** **[Oral Tramadol – Rectal diazepam – IM diclofenac – Intranasal diamorphine]** The child is screaming of pain. So, he needs a **Strong** + **Quick-onset Analgesic**. √ Tramadol and codeine are contraindicated in those who are < 12 years old. √ Rectal diazepam is not an analgesic. It is for convulsions/ muscle spasm. √ Diclofenac is an NSAIDs which are better avoided in cases of burn. This is because we fear of renal toxicity and delaying wound healing.

	√ IV midazolam is used for sedation. Alone, it does not relief pain. √ Intranasal diamorphine (Dia-Morphine) is a rapid-acting analgesic (onset of action is around 5 minutes). It is good for moderate-severe pain as in major burn. It is useful especially if **oral morphine** is not available. Thus, the most suitable answer is → **Intranasal diamorphine**. ◙ **What if the same options were given but paracetamol is given instead of intranasal diamorphine?** → Pick paracetamol (given initially to try to relieve pain). ◙ **What if the same options were given but oral morphine is given instead of intranasal diamorphine?** → Pick oral morphine (given initially to try to relieve pain).
Key 178	**A child > 3 YO + recurrent UTI** √ The **first** scan to be done → Ultrasound "within 6 weeks of the last UTI". Chronic recurrent inflammation of the bladder would lead to scarring and thickening of the bladder wall + dilatation of ureters (**vesicoureteric reflux**). √ **Further** scan → DMSA = dimercaptosuccinic acid",

	"To look for renal scarring, not urgent, 4-6 months after the acute infection". **Micturating cystourethrogram** -MCUG- is **not** done after the age of 3 years. It is **invasive** as it involves contrast of bladder, catheter, high radiation. It visualises bladder and urethral anatomy & can detect vesicoureteric reflux.
Key 179	**A girl with epilepsy on the maximum dose of sodium valproate. However, she is having seizure attacks frequently. What is the most appropriate NEXT step?** → **Request serum sodium valproate level.** This is to check her adherence to the treatment. She might not be taking the required doses. A serum level of the medication will determine. After that, we may go for further steps accordingly.
Key 180	**Read the following 2 scenarios and compare:** **Scenario (1)**

A 3-month-old baby girl is seen in the A&E with her mother. The mother says that the baby rolled over and fall off the bed and hit her head on the floor. There is a 3 cm bruise on the left occipital side of the head. There is a weight loss of this baby on her weight chart. What is the most appropriate initial management?

→ Involve safeguarding team.

2 points mentioned here raise concerns about a possible child abuse which needs safeguarding team to get involved for more investigations:

√ This baby is 3 months old. Babies mostly cannot roll from back to tummy before the age of 5 months.

√ The noticeable weight loss.

Scenario (2)

A 3-month-old baby girl is seen in the A&E with her mother. The baby has **fever, and looks ill**. The baby had URTI last week that was treated. The mother says that the baby rolled over and fall off the bed and hit her head on the floor. There is a 3 cm bruise on the left occipital side of the head. There is a weight loss of this baby on her weight chart. What is the most appropriate initial management?

→ Admit and investigate.

	2 points mentioned here raise concerns about a possible child abuse which needs safeguarding team to get involved for more investigations: √ This baby is 3 months old. Babies mostly cannot roll from back to tummy before the age of 5 months. √ The noticeable weight loss. However, since the baby in scenario 2 is **now ill and has fever**, the initial step would be to **admit and investigate** (for treating the baby). While he is admitted, safeguarding team can be involved.
Key 181	◙ If the newborn is **exclusively breastfed** and **not gaining weight** developed (Nausea, Vomiting, Colicky abdominal pain, Pruritus, Erythema Soon after a feed) → **Continue breastfeeding but remove dairy from mother's diet**. ◙ If the newborn is **exclusively formula fed** and **not gaining weight** developed (Nausea, Vomiting, Colicky abdominal pain, Pruritus, Erythema Soon after a feed) → **Start extensively hydrolysed formula**. (A type of **hypoallergenic formula**).
Key 182	√ If a febrile seizure **lasts < 5 min** → **Antipyretics (e.g., Paracetamol)** √ If **lasts > 5 min** → **Benzodiazepine** (e.g., **buccal Midazolam**).

	(If IV line is inserted → **lorazepam**). ***Note**: If the question asks about a medication that would ((**STOP**)) the current ongoing seizure, the answer is a benzodiazepine (eg, diazepam, lorazepam).* Remember, paracetamol does not terminate a current ongoing seizure, it can be given after benzodiazepine.
Key 183	**Important Note:** **Infants age 0-3 months + a fever of ≥ 38 degrees** **→ RED class (ie, high risk of serious illness)** **→ Admit + Perform infectious screen + Start parenteral antibiotics and antipyretics (eg, paracetamol, ibuprofen).** **Even if their other observations are normal!**
Key 184	**Quick Notes on Turner's Syndrome (Female 45 XO):** √ It results when one of the X chromosomes (sex chromosomes) is missing or partially missing (45 XO). √ **Important**: Turner's syndrome is characterised by inability to produce oestrogen. This would ultimately lead to ↑FSH and LH (due to the loss of negative feedback).

A previous question: What are the hormonal changes in Turner syndrome?

→ ↓Oestrogen, ↑FSH and LH.

√ Most ♀ have normal intelligence BUT some **still have learning difficulties**.

√ Human Growth Hormone (**GH**) **is used** during childhood to increase the height (effective and a part of the management).

√ **Oestrogen Replacement Therapy** can be used during **CHILDHOOD** to enhance Breasts and Hips development **and** to prevent Osteoporosis.

√ Advanced age of mother is **NOT** a risk factor for Turner's syndrome.

√ Turner's ♀ are **infertile** (Ovarian Dysgenesis). However, some **can conceive** by the assisted reproductive techniques.

Important Features of Turner's Syndrome:

Short stature | Short Webbed neck | Widely spaced Nipples |

OVARIAN FAILURE (1ry Amenorrhea) | Impaired Pubertal

Growth | Bicuspid Aortic Valve

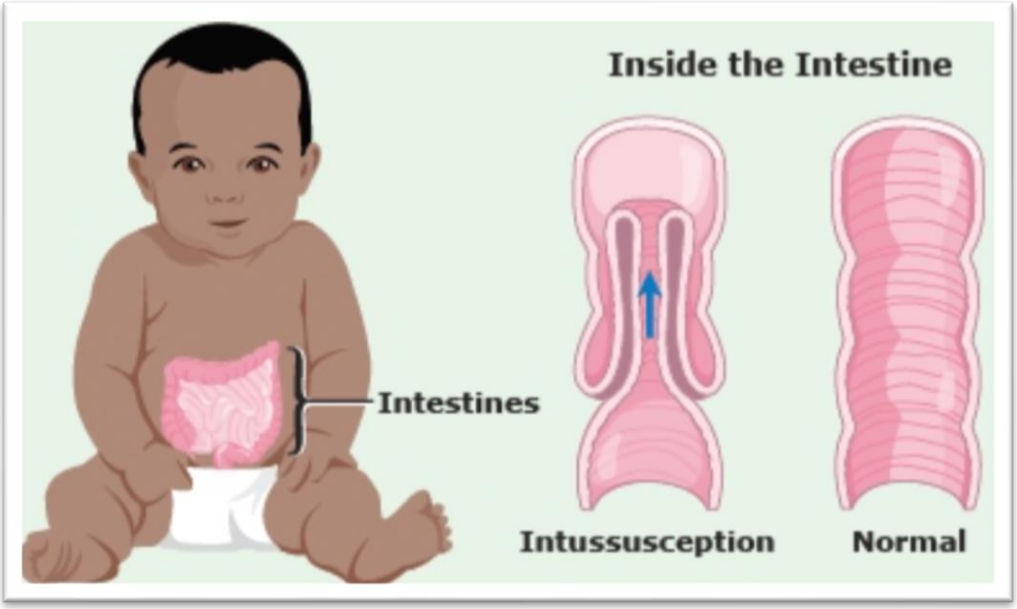
Example,

	◙ 12 YO ♀ is short for her age and has extra skin fold on the neck. One important additional feature is → **Ovarian Failure** (1ry Amenorrhea). **Example,** ◙ 16 YO ♀ with 1ry Amenorrhea, Short stature, Low set of ears, Broad Chest, Widely spaced nipples. The Likely Dx → **Turner's Syndrome (45 XO)**
Key 185	**Important Notes on Laryngomalacia:** ♦ Congenital abnormality of the **Larynx**. √ ♦ Typically presents at 4 weeks of age with → **Stridor**. ♦ Stridor can be worse on crying. ♦ Usually resolve within one year of life. ♦ Laryngomalacia is the most common congenital airway disorder and the most common cause of stridor in neonates. **Asked before:** **What structure is not fully developed at birth?** → **Larynx**.

Key 186

Important Notes on Intussusception:

• Intussusception → the invagination of one portion of the bowel into the lumen of the adjacent bowel, most commonly around the ileo-caecal region.



• It typically presents between 6 and 36 months of age (ie, 0.5-3 years old).

• It is the most common cause of intestinal obstruction in this age group.

• Boys are affected twice as often as girls.

• **Features of Intussusception:**

√ Intermittent, severe, crampy, progressive abdominal pain.

√ Inconsolable crying, irritability.

√ During paroxysm the infant will characteristically draw their knees up and turn pale.

	√ Vomiting. √ Bloodstained stool - 'red-currant jelly' - is a late sign (rectal bleeding). √ Sausage-shaped mass in the right upper quadrant. • **Investigation:** Ultrasound is the investigation of choice and may show a target-like mass. • **Management** √ The majority of children can be treated with reduction by air insufflation under radiological control, which is now widely used first-line compared to the traditional barium enema. √ If this fails, or the child has signs of peritonitis, surgery is performed. • **Important Note:** √ A rare complication of Henoch-Schonlein Purpura (HSP) is intussusception. √ **HSP → PAAN**: non-blanching **P**urpura (mainly on buttocks and lower limbs ± **A**rthralgia, **A**bdominal pain, **N**ephropathy (Hematuria, Proteinuria). √ So, if a baby has pruritic rash (purpura), abdominal pain and arthralgia and then develops severe abdominal pain, rectal bleeding and irritability: Think → Intussusception (as a complication of Henoch-Schonlein Purpura HSP). √.
Key 187	**A 24-month-old baby cannot put 2 or more words in a sentence, and can only say one word as "mama", "dada". Is this a normal development?**

No, this is a → Delayed Verbal "Language" "Speech" Development.

Key 188

Hemolytic Uremic Syndrome (HUS)

Triad:

Hemolytic Anemia

Uremia (Acute Renal Failure)

Thrombocytopenia (Low Platelets)

♦ ***Children***

√ (eg, after a trip where they have eaten E. coli contaminated food).

Eating Undercooked Contaminated food → E. Coli O157 → Produce Verotoxin → Profuse Diarrhea → turns to Bloody Diarrhea → (after 2-14 days) → Uremia "Acute Kidney Injury" (Hematuria, Proteinuria, ↑ Urea and Creatinine).

So, remember:

- **Diarrhea** → turns **Bloody** → **Renal Failure** (**Hematuria**, **proteinuria**…etc).

± **Features of Anemia** (e.g. Pallor, Fatigue) **± Low Platelets**

HUS is the commonest cause of acute kidney injury in children.

Rx of HUS → Supportive

√ **IV fluids** √ ± **Blood Transfusion** √ ± **Dialysis** (if required)

√ If Very Severe → Plasma Exchange

◙ **Never Give Antibiotics in HUS**!

(More toxins are released as the E. Coli dies)

Scenario:

Bloody Diarrhea (followed by) Renal impairment e.g., Hematuria/ Proteinuria/ high creatinine ± Schistocytes on blood smear, ↓ Platelets

→ HUS (Hemolytic Uremic Syndrome).

→ E. Coli.

(The most common cause of HUS and bloody diarrhea in children is E. Coli/ Schistocytes on blood smear, dehydration, anemia, bloody diarrhea, ↓platelets, ↓ renal function tests).

Key 189

Celiac Disease VS Cystic Fibrosis in Children

A 24-year-old child (2-year-old) presents with his parents as he has been having a smelly loose stools and abdominal distention for the past few months. He is not being able to gain sufficient weight as well despite feeding well. His food is the same as his family. He looks pale. What is the most likely diagnosis? Investigation? Management?

Steatorrhea (loose smelly stools) due to fat malabsorption, **abdominal distension** and **failure to thrive** (not gaining weight sufficiently) are features of celiac disease. Also, he is **pale** because of anemia (which is also prominent in celiac disease due to malabsorption).

- Dx → **Celiac disease**.
- Investigation (1st line) → **Tissue TransGlutaminase Antibodies (TTG)**.

If not given → **Anti-Endomysial Antibodies**.

- To confirm Dx → **Jejunal/Duodenal Biopsy** → Villous Atrophy, ↑ lymphocytes.
- Rx → **Gluten-free diet**.

Why not cystic fibrosis?

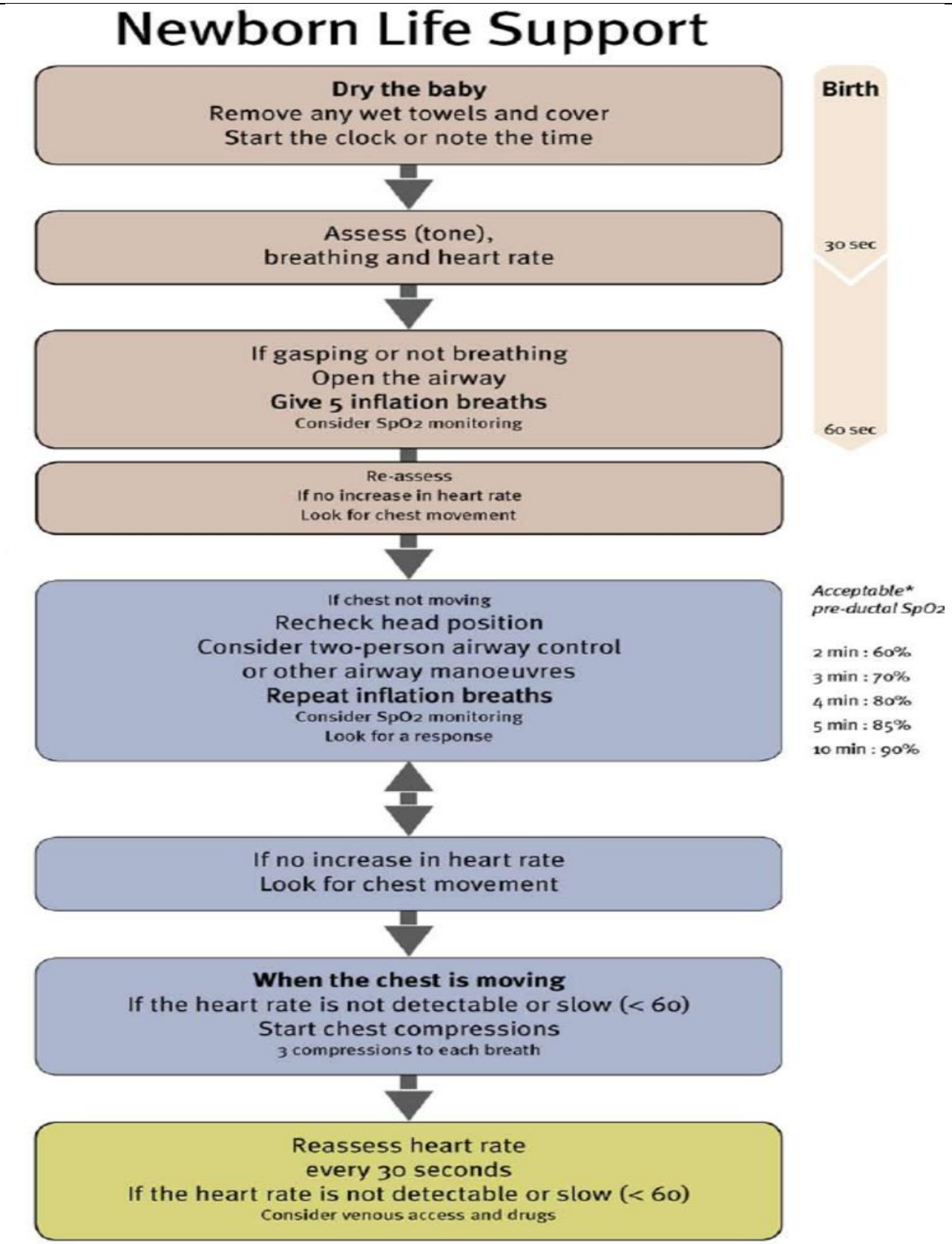
In CF, hints other than steatorrhea (malabsorption) would be given (eg, ***recurrent respiratory infections***, ***repetitive cough*** over the past few months ± Delayed growth and Abdominal distension). In this case, CF would be suspected and (***Sweat chloride test*** would be requested).

Key 190

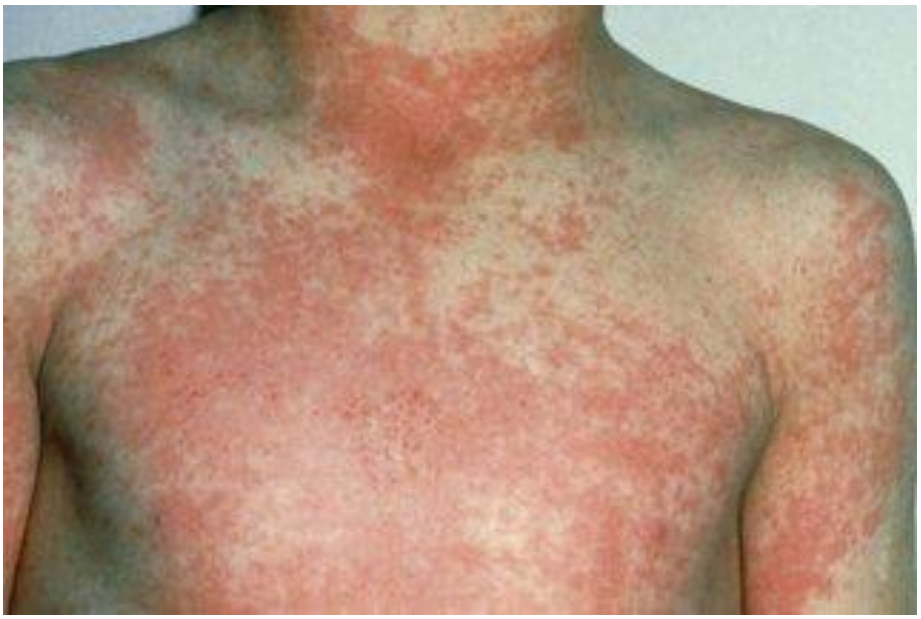
The first step following a delivery of any baby is to

→ Dry and stimulate the baby, ensure they are kept warm.

If still no breathing/ crying → Give 5 inflation breaths (lasting 2-3 seconds).



Key 191	**What is the best (resuscitation) fluid for children < 6 months old?** → Crystalloid fluid; 10 ml/kg stat (eg, in hypovolemic shock). **Examples**: Plasma-lyte / Hartmann's solution / Ringer's lactate. **What is best for (maintenance)?** → 0.9% normal saline (NaCl) with 5% dextrose. **What if the child is NOT in shock, and is able to tolerate oral fluids?** → Oral fluid challenge. *Children are given small amounts of fluids at regular intervals and monitored to see if they will tolerate it and become hydrated again or if no → IV fluids.*
Key 192	• As part of the UK screening programs, pregnant women should be screened for **hepatitis B infection** as it can be transmitted to their coming babies. **• Babies who are born to a highly infectious mother should receive:** → Hepatitis B vaccine + Hepatitis B Immunoglobulin.
Key 193	**What is the most common long-term health problem in babies born with congenital cytomegalovirus infection?** → **Sensorineural hearing loss**.

	However, the most likely outcome is → **normal development**. ***Important**: SNHL is the most common long-term "complication if any". But the most common outcome is complete resolution with normal development.*
Key 194	**The first-line treatment of minimal change disease (eg, Nephrotic Syndrome)** → Prednisolone.
Key 195	A child + fever (high) + Sore throat (with pale exudates on the tonsils) + white coating on the tongue + painful swollen cervical lymph nodes + followed by Maculopapular rash on chest and back. Think → Scarlet fever. 
Key 196	**Pre-natal ultrasound** (before birth) that shows (**Echogenic Bowel**) is suspicious for **Cystic Fibrosis**.

	To confirm the diagnosis → **Sweat test** (at 48 hours of age).
Key 197	• **Brief staring spells that last for a few seconds, during which the child loss awareness temporarily, and cannot respond to verbal stimuli, and cannot remember the event afterwards** → **Absence seizure**. • **To confirm the diagnosis** → **EEG: Electroencephalogram**.
Key 198	**Meconium ileus** is present (**not being passed in the first 2 days of life**) + **Bilious greenish vomiting** + Abdominal distension + Crying → **Hirschsprung's disease**. To confirm → X-ray or rectal biopsy.
Key 199	**Remember:** For **whooping** cough (ie, **pertussis**), the most appropriate investigation is → **Per-nasal swab culture for *Bordetella pertussis*** -imp. √- may take several days or weeks to come back. **Important**: **per-nasal** swab, NOT nasopharyngeal, oral or throat wab!
Key 200	**Wilm's Tumour (Nephroblastoma)** • It is the most common renal malignancy in children (mostly 3-4 years old). • Clinically → asymptomatic abdominal mass that does not cross the midline.

Key 201

Remember: **Innocent Murmur** (a benign condition, not a heart disease).

6-S for **Innocent Murmur** (in children 3-6 years old)

- **S**ystolic,
- **S**oft blowing,
- **S**hort,
- ↑ (Louder) in **S**upine position, (Important: ↑, NOT ↓ in Supine Position) √.
- **No** other **S**ymptoms, (eg, no chest pain, dyspnea, syncope).
- Heard best at the left lower **S**ternal border.

Key 202

Adenovirus

Adenovirus is a common cause of respiratory infections in children.

Signs and Symptoms:

√ Fever.

√ Sore throat (erythematous but WITHOUT exudates). "**Note**: in streptococcus pharyngitis, sore throat is usually painful & associated with tonsillar exudates".

√ Runny nose.

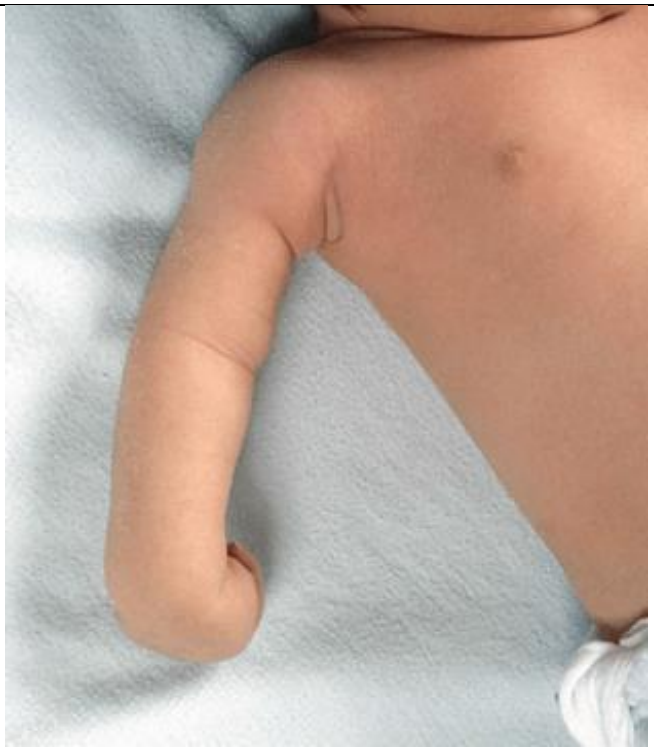
√ Lethargy.

√ Swollen cervical lymph nodes.

√ Contagious.

√ (±) blanching rash.

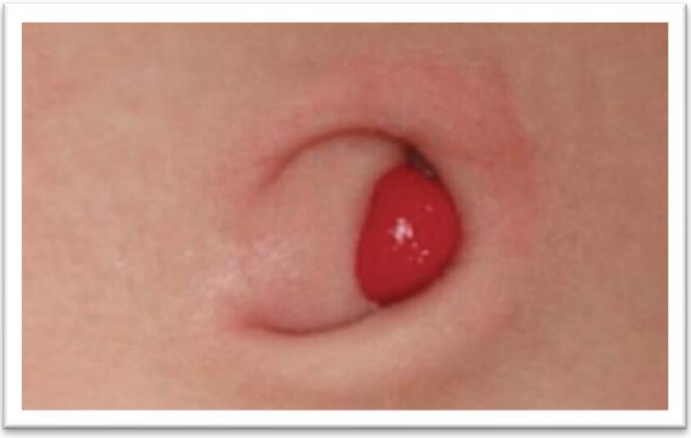
Key 203	**Septic Arthritis in Children** **Fever + Refusal to use the affected limb +** Common in **hip** joint. **Example:** A 3-year-old boy presents with fever and refusal to bear weight on his left leg. He is irritable and less active than usual. There is no history of trauma or recent illnesses. Think → Septic arthritis. *Important Differential Diagnosis → Transient synovitis (it often follows a viral infection, and the fever is typically milder).*
Key 204	**Erb's Palsy** • Erb's palsy is a condition resulting from an injury to the upper trunk of the brachial plexus, typically occurring during childbirth (complicated delivery). • The injury can occur due to excessive stretching of the infant's neck to the side during a difficult delivery. • **Clinically**: the elbow extended, the wrist and fingers flexed (waiter's tip).

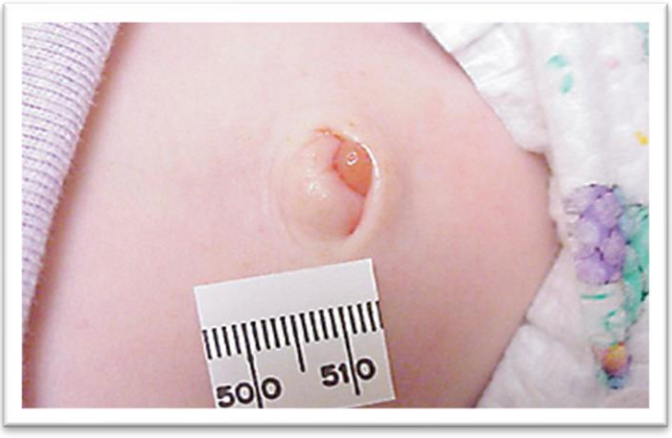


Erb's palsy

Key 205

Newborn Umbilical Granuloma





A **newborn umbilical granuloma** is a common and benign condition where a small, moist, pink nodule forms at the base of the umbilicus after the

umbilical cord stump falls off. This occurs due to excess granulation tissue during the healing process. It is typically non-infectious and presents with a slight discharge but no significant pain or signs of infection like redness or swelling.

Management

1. **Table Salt Application**: This first-line treatment involves applying a pinch of table salt to the granuloma, covering it with gauze for 30 minutes, and cleaning the area twice daily. This method is safe, cost-effective, and usually effective within a week. (Table Salt is Tried First)!
2. **Silver Nitrate Cauterization**: If the table salt treatment fails, silver nitrate is used to cauterize the granuloma. This method effectively reduces the granuloma and promotes healing.

Umbilical granulomas generally respond well to these treatments, and surgical intervention is rarely needed. Regular follow-up is important to ensure resolution and to monitor for any signs of infection.

Key 206

Controversial Scenario: Diverse Opinions on the Valid Answer!

A 2-month-old baby girl is brought to the clinic with excessive crying and irritability after every feed. Born at term via an uncomplicated vaginal delivery with a birth weight of 3.2 kg (50th percentile), she lost 7% of her weight in the first week but gained steadily, weighing 5.0 kg (60th percentile) at 2 months. The mother, who exclusively breastfeeds, is concerned about a possible cow's milk protein allergy. Physical examination reveals no abnormalities. What is the most appropriate next step in management?

Options

A) Introduce a hypoallergenic formula.

B) Eliminate dairy from the mother's diet.

C) Maintain breastfeeding without any changes.

D) Refer to a paediatric specialist for allergy testing.

E) Suggest reducing overall protein intake for the mother.

Our Answer → B) Eliminate dairy from the mother's diet.

Quick Explanation:

Eliminating dairy from the mother's diet is a targeted approach to addressing suspected cow's milk protein allergy (CMPA) in a breastfed infant. CMPA can cause symptoms such as excessive crying and irritability due to the passage of cow's milk proteins from the mother's diet into her breast milk.

Comment on Weight Loss:

It is normal for newborns to lose up to 10% of their birth weight in the first week of life. This weight loss is typically due to the baby adjusting to feeding outside the uterus and losing excess fluids. Most infants regain this weight by the end of the second week.

Reasoning for Choosing "Eliminate Dairy from the Mother's Diet" Over "Maintain Breastfeeding Without Any Changes":

- **Addressing the Allergen**: By eliminating dairy, the potential allergen is removed from the breast milk. This directly targets the suspected cause of the infant's symptoms.
- **Symptom Improvement**: Many infants with CMPA show significant improvement within 1-2 weeks after the mother removes dairy from her diet, making it an effective first-line intervention.
- **Continued Breastfeeding**: This option allows the mother to continue breastfeeding, which has numerous health benefits for the infant, while also addressing the allergy concern.
- **Evidence-Based Practice**: Clinical guidelines and evidence support the elimination of dairy from the maternal diet as a safe and effective way to manage suspected CMPA in breastfed infants.

Argument

Intro for the Arguer Believing in Continuing Breastfeeding:

Some healthcare professionals believe that the best approach is to continue breastfeeding without any changes. They think the baby's crying and irritability after feeds could be due to common issues like colic or feeding problems, rather than cow's milk protein allergy (CMPA). They argue that:

• **Infant Colic**: Colic involves episodes of crying for more than three hours a day, more than three days a week, in an otherwise healthy baby. It usually goes away on its own.

• **Feeding Technique**: Problems with how the baby latches or the feeding position can cause discomfort and crying. Fixing these issues can often help.

• **Lack of CMPA Symptoms**: Without symptoms like rashes, vomiting, or diarrhoea, CMPA (cow's milk protein allergy) seems less likely.

Counter-Argument:

While it's important to consider colic and feeding problems, the argument for continuing breastfeeding without changes misses some key points:

1. **CMPA Can Have Mild Symptoms**:

CMPA (cow's milk protein allergy) can cause subtle symptoms like irritability and crying after feeds. It doesn't always show severe symptoms like rashes or diarrhoea. Trying a dairy-free diet for the mother is a safe and simple first step to see if CMPA is the cause.

2. **Trial Benefits**:

A trial of eliminating dairy can provide useful information. If the baby's symptoms get better, it supports the idea that CMPA is the cause. If not, other causes can be explored.

3. **Evidence Supports This Approach**:

Many paediatric guidelines recommend trying a dairy-free diet for suspected CMPA because it can significantly help the baby's symptoms. This approach is supported by research and can prevent ongoing discomfort for the baby.

4. Missing Features for Other Diagnoses:

The scenario doesn't mention signs like frequent spit-up (seen in reflux GORD) or the specific crying patterns of colic. Without these, CMPA is still a strong possibility that needs a step (which is simple) to try and see.

Conclusion

• In managing an infant with excessive crying and irritability after feeds who is exclusively breastfed, the argument to maintain breastfeeding without changes overlooks important considerations. While colic, reflux (GORD), and feeding issues should be evaluated, cow's milk protein allergy (CMPA) must also be considered given the symptoms.

• Eliminating dairy from the mother's diet is a practical, evidence-based first step. This approach is non-invasive and directly addresses the potential allergen, often improving symptoms within 1-2 weeks. Clinical guidelines support this method for its safety and effectiveness in managing suspected CMPA while maintaining breastfeeding benefits.

• Continuing breastfeeding without dietary changes may prolong the infant's discomfort if CMPA is the cause. Thus, recommending the elimination of dairy allows for systematic evaluation of the infant's response, ensuring comprehensive care. If CMPA is not the cause, other diagnoses like colic or reflux can be explored, providing the best possible outcome for the infant.

Key 207

Imaging and Management of Paediatric UTIs (Simplified)

Types of Imaging Tests:

Ultrasound:

- First-Line Test: Non-invasive with no radiation.
- Uses: Evaluates Structural anatomy, kidney size, and congenital anomalies.
- Limitations: Does **not** detect mild to moderate vesicoureteric reflux.

Micturating Cystourethrogram (MCUG):

- Gold Standard: Detects vesicoureteric reflux (25%-40% of children with UTIs).
- Procedure: Requires catheterisation and involves radiation exposure.

DMSA (Dimercaptosuccinic Acid) Scan:

- Purpose: Detects renal scarring or damage.
- Timing: Done 4-6 months after infection to avoid false positives.
- Method: Uses radioactive isotopes concentrated in renal tissue.

Definitions and Management Based on UTI Type:

- **Straightforward UTI:**

Responds to treatment within 48 hours.

- **Atypical UTI:**

Includes failure to respond to treatment, septicaemia, raised creatinine, or non-E. coli infections.

- **Recurrent UTI:**

Two or more episodes with pyelonephritis or three episodes with cystitis/lower UTI.

Age-Specific Imaging Recommendations:

Age	Straightforward UTI	Atypical UTI	Recurrent UTI
Below 6 Months	Ultrasound within 6 weeks. If U/S is abnormal → MCUG	Ultrasound during infection, DMSA 4-6 months after, MCUG	Ultrasound during infection, DMSA 4-6 months after, MCUG
6 Months to 3 Years	No routine imaging.	Ultrasound during infection, DMSA 4-6 months after, consider MCUG.	Ultrasound within 6 weeks, DMSA 4-6 months after. consider MCUG.
Above 3 Years	No routine imaging.	Ultrasound during infection	Ultrasound within 6 weeks, DMSA 4-6 months after infection

Key Rules to Remember:

- Ultrasound within 6 weeks if straightforward UTI.
- For infants below 6 months who do not respond to antibiotic treatment, the guidelines recommend an MCUG to assess for structural abnormalities and reflux that might not be apparent on ultrasound alone.
- No ultrasound needed for straightforward UTI above 6 months.4
- Always perform ultrasound during acute infection if atypical (despite age).
- Perform DMSA scan 4-6 months after atypical or recurrent infection.
- Avoid MCUG after 3 years of age.

Example Scenarios

Scenario 1: A 4-week-old infant presents to the paediatric clinic with a three-day history of high-pitched crying and intermittent fever peaking at 38.8°C. On examination, the baby is febrile and appears uncomfortable. A urine dipstick test shows positive results for both leukocytes and nitrites. The infant responds well to antibiotics within the first 48 hours. A urine culture confirms significant E. coli growth. Which investigation would be most appropriate to perform next?

Options

A) Voiding cystourethroscopy.

B) Repeat urine culture in 48 hours.

C) Micturating cystourethrogram (MCUG).

D) Ultrasound of the kidneys and bladder.

E) No further investigation required.

Answer: → D) Ultrasound of the kidneys and bladder.

Detailed Explanation:

According to UK medical guidelines, after an initial UTI caused by E. coli in a young infant, it is crucial to perform an ultrasound of the kidneys and bladder to check for any structural abnormalities.

In this case (a straightforward UTI that responds well to antibiotics), the ultrasound does not have to be during infection, but within 6 weeks of the infection. If it was atypical or recurrent UTI, the ultrasound should be done during infection. Here's why this approach is recommended:

1. **First-Line Imaging**: Ultrasound is non-invasive, does not involve radiation, and is effective in identifying anatomical issues in the urinary tract, such as hydronephrosis or bladder anomalies.
2. **Guidelines Compliance**: For infants below 6 months with their first UTI, UK guidelines recommend an ultrasound within 6 weeks if the infection is straightforward, and the infant responds well to antibiotics. This ensures early detection and management of any underlying issues that may predispose the infant to recurrent UTIs.
3. **Subsequent Steps**: If the ultrasound shows any abnormalities, further evaluation with a Micturating Cystourethrogram (MCUG) may be indicated to assess for vesicoureteric reflux (VUR).

Option Analysis:

A) Voiding cystourethroscopy: This is an invasive procedure not typically used as the first investigation for infants with their first UTI.

B) Repeat urine culture in 48 hours: This is unnecessary if the infant has responded well to antibiotics and the initial culture already confirmed E. coli.

C) Micturating cystourethrogram (MCUG): This is usually reserved for cases with abnormal ultrasound findings or recurrent infections, not as the first step. Even if atypical or recurrent UTI in an infant, ultrasound during infection is done first.

D) Ultrasound of the kidneys and bladder: This is the recommended next step as it is non-invasive, effective, and aligns with guidelines for initial imaging in infants with UTI.

E) No further investigation required: This is not appropriate as it would miss potential structural abnormalities that could lead to recurrent infections.

What if this baby did not respond well to antibiotic within 48 hours (ie, Atypical UTI)?

In the case of an infant below 6 months old with a confirmed E. coli UTI who does **not** respond well to antibiotics, the UK medical guidelines suggest the following steps:

1. **Ultrasound During Infection**: This is typically the initial imaging study to assess for any gross structural abnormalities in the kidneys and urinary tract. It is non-invasive and provides valuable information about the anatomical structure.
2. **MCUG (Micturating Cystourethrogram)**: If the ultrasound reveals abnormalities or if there is a high suspicion of vesicoureteric reflux (VUR), an MCUG is recommended to provide a detailed assessment of the urinary tract, particularly to identify VUR.

3. **DMSA Scan**: This is performed 4-6 months after the infection to check for renal scarring or damage. It is not the immediate next step during an acute infection but is part of the follow-up to assess the long-term impact on the kidneys.

Correct Answer

The correct immediate next step if the infant does not respond well to antibiotics is an ultrasound during infection. This will help identify any immediate anatomical issues that need to be addressed. If the ultrasound findings are abnormal or if VUR is strongly suspected, then an MCUG would follow.

Scenario 2: A 2-month-old baby girl presents with a high fever and irritability. A urine dipstick test is positive for leukocytes and nitrites, and a urine culture confirms E. coli. She responds well to antibiotics within 48 hours.

Answer: Perform an ultrasound of the kidneys and bladder within 6 weeks.

Reasoning: According to UK guidelines, an ultrasound is recommended for infants with their first UTI to check for structural abnormalities.

Scenario 3: A 6-week-old infant boy presents with a high fever and crying. A urine test confirms E. coli, but he does not respond to antibiotics within the first 48 hours.

Answer: Perform an ultrasound during the infection (Atypical UTI).

Reasoning: The guidelines suggest immediate ultrasound during infection for atypical UTI cases to identify any serious underlying issues.

Scenario 4: A 5-month-old baby girl has a high fever and irritability. A urine culture confirms E. coli, and this is her third UTI in three months. She responds well to antibiotics.

Answer: Perform an ultrasound during the infection and a DMSA scan 4-6 months later (Recurrent UTI).

Reasoning: Recurrent UTIs warrant an ultrasound during infection and a later DMSA scan to check for renal damage, in line with UK guidelines.

Scenario 5: A 2-month-old baby boy presents with a high fever and vomiting. A urine dipstick test is positive for leukocytes and nitrites, and a urine culture confirms Klebsiella. He does not respond well to antibiotics within the first 48 hours.

Answer: Perform an ultrasound during the infection, consider an MCUG if abnormalities are found on the ultrasound, and also schedule a DMSA scan 4-6 months after the infection. (Atypical UTI).

Reasoning: For atypical UTIs in infants, such as those caused by non-E. coli organisms like Klebsiella, and with poor response to antibiotics, UK guidelines recommend an ultrasound during infection to identify structural abnormalities, followed by an MCUG to check for vesicoureteric reflux if necessary. A DMSA scan is also recommended 4-6 months after the infection to assess for renal scarring. MCUG is usually avoided in children older than 3 years.

Key 208

Imaging and Management of Paediatric UTIs (Summarised)

• Initial Imaging for **Infants** with confirmed **UTI** → Ultrasound of the kidneys and bladder.

• Be aware that the **timimg** of the Ultrasound (US) differs based on:

✓ If the urinary tract infection (UTI) is **straightforward** (ie, responds well to antibiotics within 48 hours) → Ultrasound is done within 6 weeks of infection.

✓ If the UTI does not resppond well to antibiotics or if it is caused by non- E coli (ie, **atypical UTI**) or if it is **recurrent** UTI → Ultrasound is done during infection.

• Be aware that if the **ultrasound results show abnormalities**
→ Micturating Cystourethrogram (MCUG): to assess vesicoureteric reflux.

• Be aware that in the case of **atypical** and **recurrent** UTIs in infants, in addition to US during infection, DMSA scan should be done 4-6 months after UTI (to assess for renal damage and scarring).

Key 209

Audiological Assessment in Children with Speech Delays

A 2-year-old boy is seen in the paediatric clinic by his parents who are concerned about his lack of response to sounds and delayed speech development. There is no history of ear infections, and his physical examination is unremarkable with no signs of fluid in the ears, no nasal congestion, and no throat abnormalities. They report that he primarily makes monosyllabic noises and often does not respond when his name is called. His

	developmental milestones were previously appropriate. Which of the following is the most appropriate referral for this child? **Options** A) Discharge back to GP. B) Neurologist. C) Speech therapist. D) ENT specialist. E) Audiology. **Answer →** E) Audiology. • When a child has **speech delays** possibly linked to hearing issues, an **audiologist** can evaluate for hearing loss, which is a common and treatable cause of speech delays. Audiological assessments are crucial to exclude hearing impairments. • If hearing loss is identified, the audiologist determines its type (conductive, sensorineural, or mixed) and severity (mild to profound), guiding the best intervention strategies like hearing aids. • Assessing hearing is essential before referring to other specialists, like a speech therapist or ENT, unless other symptoms suggest different issues. This child shows no additional ENT symptoms, making an audiology referral the most appropriate initial step.
Key 210	**Febrile Seizures Management in Children** A 4-year-old boy is brought to the Emergency Department after experiencing a febrile seizure at home. The mother reports that the child had a brief, generalised tonic-clonic seizure earlier in the day, which resolved spontaneously. On arrival, the child has a temperature of 38.9°C and begins to seize again. The seizure has been ongoing for approximately 3 minutes. The child has no prior history of neurological disorders and is otherwise healthy.

What is the best initial intravenous medication to administer to manage this child's seizure?

Options

A) Phenytoin. B) Paracetamol. C) Ibuprofen. D) Midazolam. E) Lorazepam.

Answer → E) Lorazepam.

Detailed Explanation:

• **Lorazepam** is a first-line treatment for managing acute seizures due to its rapid onset and effectiveness. It is especially suitable for status epilepticus, defined as a seizure lasting more than 5 minutes or multiple seizures without full recovery in between. Although the child's seizure in this scenario has only lasted about 3 minutes, lorazepam is still the best option to prevent the seizure from extending beyond 5 minutes.

• **Midazolam** is also effective and can be administered buccally if IV access is difficult. However, lorazepam is preferred when IV access is available due to its longer duration of action.

• **Paracetamol and Ibuprofen** are antipyretics that help reduce fever but do not address the seizure itself.

• **Phenytoin** is a second-line treatment, generally used if lorazepam does not successfully stop the seizure.

In summary, lorazepam remains the optimal choice for initial intravenous treatment to manage seizures effectively.

When Paracetamol Would Be the Right Answer?

Paracetamol is the right answer when the primary goal is to reduce fever, not to control a seizure directly. Here are scenarios where paracetamol would be appropriate:

1. **Fever Management**: For a child with a high fever but **no** ongoing seizure activity, administering paracetamol can help reduce the fever and prevent febrile seizures.
2. **Post-Seizure Care**: After a seizure has been controlled with appropriate anticonvulsant medication, paracetamol can be given to manage the underlying fever, which is a common trigger for febrile seizures.

Example Scenario

A 3-year-old girl is brought to the Emergency Department with a high fever of 39°C. She had a brief febrile seizure at home that lasted for less than a minute and resolved on its own. Upon arrival, she is alert and responsive but still febrile. What is the most appropriate next step?

Answer: Administer paracetamol to reduce the fever.

Reasoning: Paracetamol is appropriate for managing the fever, which can help prevent further febrile seizures. Since the seizure attack has resolved, the immediate focus is on fever reduction to prevent recurrence.

Key 211

Educative Scenario for Paediatrics (Important to study thoroughly)

A 6-year-old girl presents with a 3-day history of fever, cough, runny nose, and conjunctivitis. On examination, white spots with a bluish-white centre on a red background are observed on the buccal mucosa. These spots appeared a day before the onset of a red, blotchy maculopapular rash that started on her face and spread to the rest of her body. Her vaccination history is unclear.

Which of the following is the most likely diagnosis?

A) Stevens-Johnson syndrome.

B) Rubella.

C) Scarlet fever.

D) Kawasaki disease.

E) Measles.

Answer → E) Measles.

• The presence of **white spots with bluish/greyish-white centres on the buccal mucosa** (Koplik's spots), along with **conjunctivitis**, cough, and a red, spreading maculopapular rash, strongly points towards **measles**.

• Koplik's spots are pathognomonic of measles and typically appear just before the rash.

• The patient also has the **classic triad for measles**, which includes **cough, coryza (runny nose), and conjunctivitis**. These are key features in diagnosing measles, especially when accompanied by **Koplik's spots** and the characteristic **rash**.

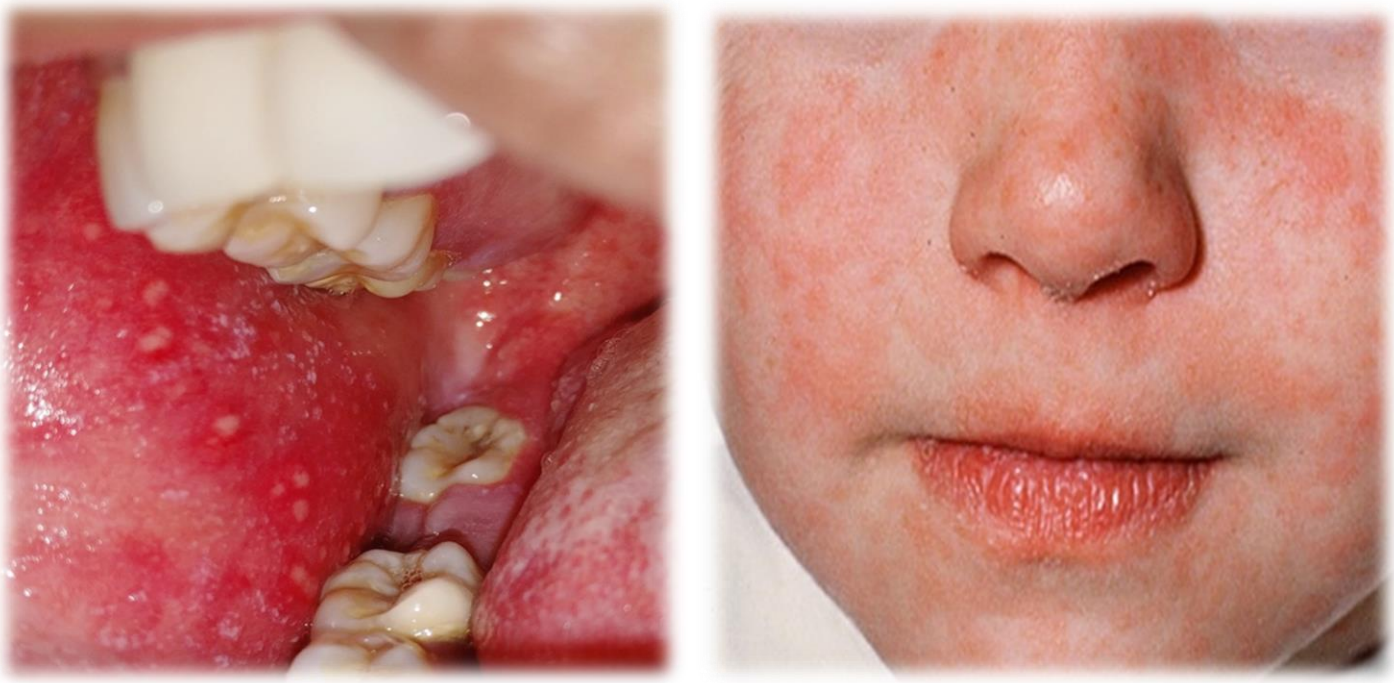
• **Treatment of Measles:** There is no specific antiviral treatment for measles. The management is **supportive** and includes **hydration**, **rest**, and **antipyretics** to manage fever. **Vitamin A supplementation** is recommended to reduce the severity of symptoms, particularly in children, as it helps prevent complications. Hospitalization may be necessary in cases with complications such as pneumonia or encephalitis.

Why not the other diagnoses?

- **Scarlet fever** presents with **fever and a sore throat**, which is a significant differentiating factor from Kawasaki disease. The child may have a

sandpaper-like rash, **painful cervical lymph nodes**, and tonsils that are often covered with **pale exudates**. **Forchheimer spots** (red macules on the soft palate) may also be seen. However, there are no Koplik's spots or conjunctivitis in scarlet fever, and the sore throat is a key feature.

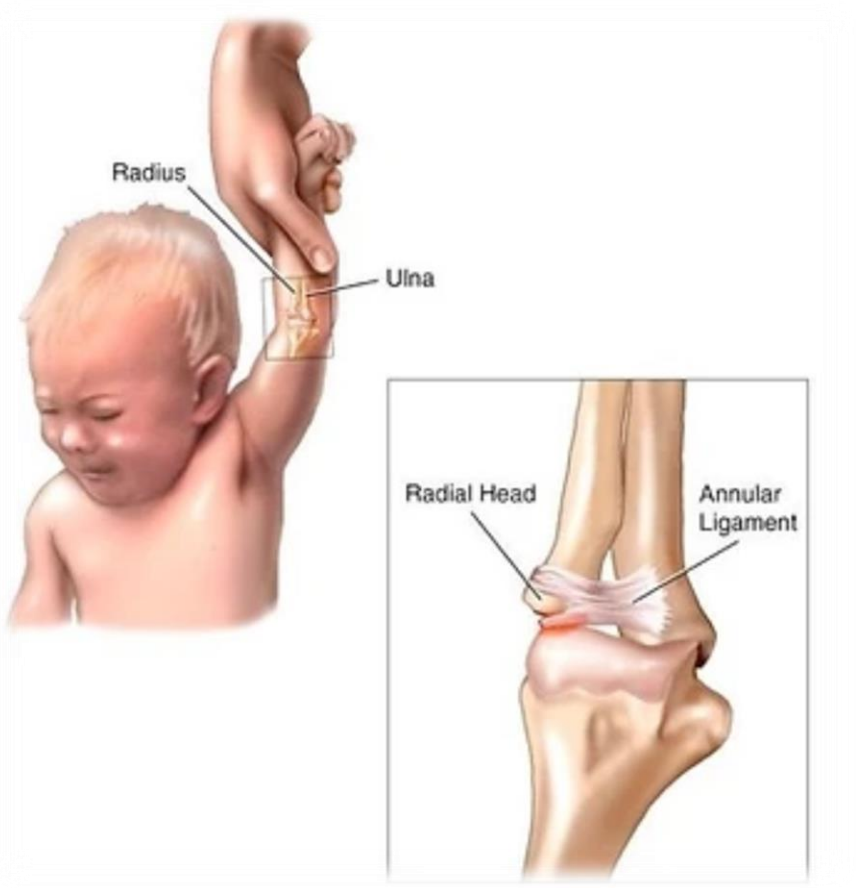
- **Stevens-Johnson syndrome (SJS)** is characterised by severe mucosal involvement, including painful ulcers in the mouth, eyes, and genitalia, alongside a widespread **target-like rash**. SJS commonly follows medication use or infections. Medications such as **antibiotics (e.g., sulfonamides, penicillins)** and **anticonvulsants (e.g., phenytoin, carbamazepine)**, as well as infections like **Mycoplasma pneumoniae**, are well-known triggers. SJS does not present with Koplik's spots or the classic triad of cough, coryza, and conjunctivitis.
- **Rubella** generally causes a milder rash that begins on the face and spreads down the body. Unlike measles, rubella does not present with **Koplik's spots** or the triad of cough, coryza, and conjunctivitis.
- **Kawasaki disease** is associated with a **fever lasting for 5 days or more** that does not respond to antipyretics, along with at least 4 of the following: **conjunctivitis**, **painless cervical lymph nodes**, **strawberry tongue/red cracked lips**, **red palms and soles** (with later desquamation), and a **polymorphous rash**. However, it does not present with Koplik's spots, which are unique to measles.



Koplik Spots and Rash in Measles

Key 212

Pulled Elbow (Radial Head Subluxation or Nursemaid's Elbow)



Pulled elbow, also known as radial head subluxation or **nursemaid's elbow**, commonly occurs in children under 5 years of age. It typically results from a sudden pull on the extended and pronated arm, causing the annular ligament to slip over the radial head.

◙ **Key Clinical Features:**

- The child may cry briefly, but this usually stops unless the arm is moved.
- Parents often report that the child is not using the affected arm.

- The child holds the affected arm flexed and close to the body, refusing to use it or to be touched (withdraws it once touched).
- Pain is typically localised to the elbow.

◙ **Examination:**

- The arm is usually held slightly flexed at the elbow, pronated, and positioned close to the body.
- Tenderness may be noted over the radial head.

◙ **Imaging:**

- Imaging is generally not required for straightforward cases of pulled elbow.
- X-rays should only be considered if there is significant swelling, deformity, or a concern about a fracture.

◙ **Management:**

- The primary treatment is to perform a **reduction manoeuvre**, which usually resolves the issue immediately. ***√ Important***.
- **Reduction manoeuvre**: This is performed by either **supination and flexion** of the forearm or **hyperpronation** of the forearm while applying gentle pressure on the radial head.

Key 213

Suspected Sepsis in Infants: Next Step?

A 3-month-old baby is brought to the Emergency Department by her parents with a history of a high fever that has lasted for the past 12 hours. The fever developed suddenly and has remained over 39.5°C, despite being given paracetamol at home. On examination, the baby looks pale, is lethargic, and has a capillary refill time of 3 seconds. Respiratory rate is 52 breaths per minute, and her pulse is 160 beats per minute. What is the most appropriate next step in management?

A) Admit for observation and start oral antibiotics.

B) Send a urine sample and wait for results.

C) Perform a septic screen and start intravenous antibiotics.

D) Administer antipyretics and discharge with safety-netting advice.

E) Immediate lumbar puncture.

The most appropriate next step is

→ **C) Perform a septic screen and start intravenous antibiotics**.

• In a baby this young, presenting with fever and signs of potential sepsis (pallor, lethargy, prolonged capillary refill, and abnormal respiratory rate), it is crucial to **perform a septic screen** to identify a serious bacterial infection such as **meningitis, sepsis**, or **urinary tract infection**. The septic screen typically includes **blood cultures**, **urine sample**, and **lumbar puncture** if meningitis is suspected.

• Early administration of **intravenous antibiotics** is essential as delays in treating a potential bacterial infection in young infants can lead to rapid deterioration.

• Note: **Septic screen** typically includes:

- **Blood cultures.**
- **Urine sample** for analysis and culture.
- **Lumbar puncture** (if meningitis is suspected).
- **Chest X-ray** (if pneumonia is suspected).

Why not the other options?

- **A) Admit for observation and start oral antibiotics**: Oral antibiotics are insufficient in this scenario. Intravenous antibiotics should be started

immediately, especially given the baby's age and the potential severity of the infection.

- **B) Send a urine sample and wait for results**: While a urine sample is part of the septic screen, it is not appropriate to wait for results without starting antibiotics, as this could delay critical treatment.
- **D) Administer antipyretics and discharge with safety-netting advice**: Discharging the baby without further investigation would be dangerous, given the risk of sepsis. Antipyretics alone are not enough in the presence of potential sepsis.
- **E) Immediate lumbar puncture**: Although a lumbar puncture may be necessary to rule out meningitis, it should be part of the septic screen. Immediate administration of intravenous antibiotics takes priority.

Sepsis Workup in Infant

Red flags for sepsis (indicating when to use the **Sepsis Six**) include:

- Fever or hypothermia in infants (especially under 3 months).
- Rapid breathing or difficulty breathing.
- Altered mental state (lethargy, confusion, or irritability).

- Pale, mottled, or ashen skin.
- Poor feeding or reduced urine output.
- Prolonged capillary refill time (>3 seconds).
- High or low heart rate.

These are indicators that prompt immediate intervention using the **Sepsis Six** protocol to prevent deterioration.

Sepsis Six is a set of six key actions to be completed within the first hour when sepsis is suspected. These actions are:

1. **Oxygen**: Administer oxygen to maintain saturation levels above 94%.
2. **Blood cultures**: Take blood cultures before starting antibiotics.
3. **IV Antibiotics**: Administer broad-spectrum intravenous antibiotics.
4. **IV Fluids**: Give intravenous fluids to maintain perfusion and blood pressure.
5. **Lactate measurement**: Check serum lactate levels to assess tissue hypoxia and guide resuscitation.
6. **Monitor urine output**: Insert a catheter and monitor urine output to assess kidney function and fluid balance.

Key 214

Fine Motor Skill Challenges in Children: Finding the Right Support

A 7-year-old child is brought to the clinic by their parents due to concerns about poor handwriting and difficulty forming letters. The parents mention that the child struggles with written tasks but has normal intellectual functioning as confirmed by previous assessments. The parents are considering whether assistive technology, such as a laptop, could support their child with schoolwork. Which professional is most appropriate to refer to for further evaluation?

A) Speech and language therapist.

B) Occupational therapist.

C) Child psychologist.

D) Neurologist.

E) Community paediatrician.

The most appropriate professional to refer to in this case is

→ **B) Occupational therapist**.

An **occupational therapist** can assess and support children who struggle with **fine motor skills**, such as **handwriting**. They are trained to help with

developmental issues related to **hand-eye coordination**, **grip**, and the ability to form letters, which are the primary concerns in this scenario. Additionally, they can provide strategies or recommend tools, such as **assistive technology** (e.g., using a laptop), to help the child perform schoolwork more effectively.

Why not the other options?

- **A) Speech and language therapist**: Speech and language therapists focus on communication issues such as speech, language comprehension, and articulation. These areas are not the primary concern here.
- **C) Child psychologist**: While a child psychologist can assess behavioural or emotional issues, the child's intellectual functioning has already been assessed as normal, so a psychologist is not the most appropriate referral for handwriting difficulties.
- **D) Neurologist**: A neurologist would be consulted if there were concerns about neurological conditions, such as seizures or motor control issues. In this case, the difficulty seems isolated to handwriting and fine motor skills.
- **E) Community paediatrician**: A community paediatrician may be involved in broader developmental concerns, but an occupational therapist would be the more specific professional for addressing fine motor skill and handwriting difficulties.

Key 215

Newborn Cyanosis: Initial Management Approaches

A 36-hour-old infant is noted to have an unusual colour by the midwives. On assessment, the baby has a respiratory rate of 72 and a heart rate of 168. Oxygen saturation is 62%, which only improves to 68% with high-flow oxygen. The infant does not show signs of increased work of breathing. A heart murmur was detected at birth, and the baby was delivered at term following an uneventful pregnancy. What is the next best course of action?

A) Intubate the baby and start mechanical ventilation in 100% oxygen.

B) Gain IV access and start a prostaglandin infusion.

C) Provide 5 inflation breaths followed by 30 seconds of ventilation breaths.

D) Take a blood culture and CRP and start broad-spectrum IV antibiotics.

E) Request an urgent chest X-ray.

The most appropriate next step is

→ **B) Gain IV access and start a prostaglandin infusion**.

This infant presents with **cyanotic congenital heart disease**, evidenced by low oxygen saturations that do not significantly improve with oxygen therapy. Since there is no increased work of breathing, the cyanosis is more likely due to a **cardiac cause**, where oxygenated and deoxygenated blood mix inadequately.

The key here is to keep the **ductus arteriosus (PDA)** open to improve blood mixing. A **prostaglandin infusion** is vital for maintaining ductal patency and preventing further deterioration in oxygenation.

Why not the other options?

- **A) Intubate the baby and start mechanical ventilation in 100% oxygen**: This would not address the underlying cardiac cause, and 100% oxygen will not substantially improve saturations in cyanotic heart disease.
- **C) Provide 5 inflation breaths followed by 30 seconds of ventilation breaths**: This is used in resuscitation when the baby is not breathing effectively. In this case, the baby is breathing normally, and the cyanosis is likely cardiac.
- **D) Take a blood culture and CRP and start broad-spectrum IV antibiotics**: This would be suitable for suspected sepsis, but the infant's presentation with a heart murmur and no signs of infection suggests a cardiac issue.

- **E) Request an urgent chest X-ray**: While useful for assessing lung conditions, a chest X-ray would not immediately resolve the cardiac issue. Starting prostaglandin therapy is the priority.

Neonatal Cyanosis, Low O2 Saturation (Key Points)

- Cyanosis in newborns can be due to **respiratory** or **cardiac causes**.
- **Respiratory causes** usually involve **increased work of breathing** and improve with oxygen therapy, while **cardiac causes** often show little improvement with oxygen.
- In **cyanotic congenital heart disease**,

  → maintaining the **patency of the ductus arteriosus** with **prostaglandin infusion** is vital to improving blood mixing and oxygenation.